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The Canadian Rural Health Conservation Contest

Widespread interest has been shown in the holding of the first rural health conservation contest in Canada, arranged by the Canadian Public Health Association in co-operation with the American Public Health Association. As previously announced, the purpose of the contest is to promote the further development of rural public health work.

The completed appraisal forms must be filed before March 15, 1938.

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Details of the contest and the entry forms are available from the office of the General Secretary, 105 Bond Street, Toronto 2, Ontario

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A Survey of the Incidence of Venereal Diseases in Toronto in 1937*

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THE Canadian Social Hygiene Council, now the Health League of Canada, has carried out several venereal-disease surveys. Surveys were conducted in 1929 and 1931 in Toronto, Ontario, and in 1931 in Winnipeg, Manitoba. In Toronto the surveys were carried out in co-operation with the Academy of Medicine, Toronto, and the results were of interest and value. The surveys showed that, compared with the results of similar surveys in seventeen cities in the United States, there apparently was less venereal disease under treatment at any one time in Toronto than in any of the other cities.

It was decided this year that another survey should be made. The Academy of Medicine again consented to co-operate and the following committee was appointed: Dr. E. J. Trow, chairman, Dr. C. H. Hair, Dr. Gordon P. Jackson, Dr. A. L. McKay, Dr. Robin Pearse, Dr. Donald Fraser, and Dr. Gordon Bates as secretary.

The committee decided that the survey should be carried out by means of a questionnaire sent to physicians, clinics, and institutions. The questionnaire was similar to that used in the previous surveys. Information was to be confidential. In reporting cases of syphilis, physicians were asked to divide their cases into early (within one year) and late (over one year, including cardiovascular and neuro-syphilis). Both of these divisions were subdivided into male and female and in age-groups of under 14 and over 14 years. The questionnaire was similarly arranged in the case of gonorrhoea into two groups: early (within two months of the beginning of infection) and

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late (cases of more than two months). These divisions were subdivided into male and female cases and in age-groups of under 14 years and over 14 years.

It was decided to attempt to complete the survey in six weeks, in time for the annual meeting of the Canadian Public Health Association.

A circular letter was sent on May 10th to every physician known to be practising in Toronto, requesting that the survey-form be filled in and returned at once. A stamped, addressed envelope was enclosed. Approximately 500 replies were received. At the end of ten days a second letter was sent. This brought 250 replies. A third letter was then sent and most of the remaining returns came in. The response therefore was very gratifying.

FINDINGS

The total number of questionnaires sent to physicians was 939 and the total number of replies received was 893. Twenty-one physicians to whom the questionnaire was sent were out of town, not in practice, or deceased. Only five of the physicians who received the questionnaire refused to report. In other words, 97 per cent. of the physicians replied. This response demonstrates that physicians generally appreciate the value of such a survey and are willing to help when there is reason to believe that something will be definitely accomplished.

Of the 893 physicians who returned their questionnaires, 417 were treating one or more cases. This would mean a percentage of 46. In similar studies elsewhere from 35 to 50 per cent. of physicians in active practice state that they treat venereal-disease patients. In the Staten Island survey it was found that 33 per cent. of the physicians had one or more cases under observation; in King's County, 37 per cent.; in Bronx County, 39 per cent; in New York County (Manhattan), 34 per cent.; and in Detroit, 39 per cent.

For convenience in comparing the findings with those of the two previous surveys, data are presented in similar form in table I.

TABLE I

SYPHILIS AND GONORRHOEA TREATED BY PHYSICIANS AND CLINICS

	Syphilis		Gonorrhoea	
	Number Treated	Per cent.	Number Treated	Per cent.
Private physicians....	978	27	1220	48
Clinics.....	2661	73	1329	52
Total.....	3639	100	2549	100

It will be seen that more cases are treated by clinics than by physicians in both diseases.

TABLE II

PERCENTAGE TREATED BY PHYSICIANS AND CLINICS BY STAGE OF DISEASE

	Syphilis			Gonorrhoea		
Treated by	Total Cases	Early	Late	Total Cases	Early	Late
Private physicians....	978	64%	23%	1220	62%	41%
Clinics.....	2661	36%	77%	1329	38%	59%

Table II shows the difference in the number of early and late cases treated by physicians and clinics and again indicates that clinics are now treating more cases of syphilis and gonorrhoea than are treated by private physicians.

TABLE III

SYPHILIS AND GONORRHOEA BY AGE AND SEX

	Syphilis				Gonorrhoea			
Age	Male	Female	Total	%	Male	Female	Total	%
Under 14....	90	88	178	4.9	3	42	45	1.8
Over 14.....	1985	1476	3461	95.1	1682	822	2504	98.2
Total....	2075	1564	3639	100.0	1685	864	2549	100.0

From table III it will be seen that 4.9 per cent. of the cases of syphilis are under 14 years of age, the ratio of males and females being almost equal. In the case of gonorrhoea, 1.8 per cent. are under 14 years of age, the ratio of female to male being more than 13 to 1, as might be expected.

It is probably unfair to assume that the 178 cases in children under 14 years of age suffering from syphilis are congenital. Further investigation is needed.

TABLE IV

SYPHILIS AND GONORRHOEA UNDER 14 YEARS OF AGE ACCORDING TO DISEASE, STAGE OF DISEASE, AND BY WHOM TREATED

	Syphilis				
	Early		Late		
Treated by	Male	Female	Male	Female	Total
Clinics.....	10	3	63	64	140
Private physicians.....	10	12	7	9	38
Total.....	20	15	70	73	178
	Gonorrhoea				
Clinics.....	0	9	0	20	29
Private physicians.....	1	11	2	2	16
Total.....	1	20	2	22	45

DISCUSSION

In this survey a number of the findings are important. In the case of both gonorrhoea and syphilis a larger number of cases are treated by clinics than by private physicians. Approximately 3 cases of syphilis are treated by clinics for 1 by private physicians. In the case of gonorrhoea, 48 per cent. are treated by private physicians and 52 per cent. by clinics. There is more syphilis and gonorrhoea in males than in females. There are more cases of early syphilis treated by private physicians than by clinics in the proportion of almost 2 to 1. The reverse is true in the case of late syphilis. A possible explanation is that the larger number of late cases of syphilis treated in clinics is due to the large number of late cases referred by hospital wards and institutions because of the use of the routine Wassermann tests. A larger number of early cases of gonorrhoea is treated by private physicians than by clinics—almost 2 to 1. More cases of gonorrhoea, on the other hand, are treated by clinics.

Approximately 90 per cent. of all cases of syphilis under treatment are late cases. Between 60 and 70 per cent. of the cases of gonorrhoea under treatment are late cases. This is simply an indication of the fact that in the case of syphilis these cases do not come under treatment early enough. This is probably true of gonorrhoea but certain factors must be considered which render these figures less significant.

It is of interest to compare the data of all three Toronto surveys.

Comparative Incidence

The incidence rates are presented in table V.

TABLE V

INCIDENCE OF SYPHILIS AND GONORRHOEA, TORONTO, 1929, 1931, AND 1937*

Disease	Year	Cases	Rate per 1000 population
Syphilis	1929	2968	4.0
	1931	3514	5.6
	1937	3639	5.64
Gonorrhoea	1929	2154	3.5
	1931	2580	4.1
	1937	2549	3.95
Both diseases	1929	5122	8.4
	1931	6094	9.7
	1937	6188	9.59

*Population in 1929: 606,370; 1931: 627,231; 1937: 645,462.

In 1929, 5,122 cases of both diseases were under treatment; in 1931, 6,049 cases; and in 1937, 6,188 cases. The total rate, however, has decreased since 1931. The rate per thousand in 1929 was 8.4; in 1931, 9.7; and in 1937, 9.59.

Cases Treated by Physicians and Clinics

In both gonorrhoea and syphilis the percentage of cases treated by private physicians as compared with the cases treated in clinics has fallen (table VI).

TABLE VI

SYPHILIS AND GONORRHOEA AS TREATED BY PHYSICIANS AND CLINICS TORONTO, 1929, 1931 AND 1937

		Syphilis		Gonorrhoea	
		Number treated	Per cent.	Number treated	Per cent.
Private Physician	1929	1286	44	1461	67
	1931	1340	38	1502	58
	1937	978	27	1220	48
Clinics	1929	1682	56	693	33
	1931	2174	62	1078	42
	1937	2661	73	1329	52
Totals	1929	2968		2154	
	1931	3514		2580	
	1937	3639		2549	

In syphilis a maximum of 44 per cent. was treated by private physicians in 1929, 38 per cent. in 1931, and 27 per cent. in 1937. In the case of gonorrhoea a maximum of 67 per cent. was treated by private physicians in 1929. This has fallen to 58 per cent. in 1931 and to 48 per cent. in 1937.

In table VII are presented data relative to the findings, in the three surveys, of the treatment of syphilis and gonorrhoea according to the stage of the disease and by whom treated. The percentage of late cases of syphilis treated by clinics has very definitely increased. It is suggested that the use of the routine Wassermann test in hospitals and other institutions may be responsible for this increase.

TABLE VII

PERCENTAGE TREATED BY PHYSICIANS AND CLINICS BY STAGE OF DISEASE, TORONTO, 1929, 1931, AND 1937

	Syphilis			Gonorrhoea		
Treated by	Total	Early	Late	Total	Early	Late
Private phys.						
1929	44%	46%	43%	67%	72%	65%
1931	38	56	33	58	74	50
1937	27	64	23	48	62	41
Clinics						
1929	56	54	57	33	28	35
1931	62	44	67	42	26	50
1937	73	36	77	52	38	59

In table VIII data for two surveys as relating to the time of treatment merit special consideration. In 1929, 29.5 per cent. of all male cases of syphilis

under treatment were early cases and 70.5 per cent. late cases. In 1937 only 10 per cent. are early cases and 89.4 are late cases. Similarly in females in 1929, 32 per cent. of all cases were early cases and 68 per cent. were late cases. In 1937, 9.8 per cent. were early cases and 90 per cent. were late cases.

TABLE VIII

SYPHILIS AND GONORRHOEA BY SEX AND STAGE OF DISEASE, 1929 AND 1937

	Syphilis		Gonorrhoea	
	Early	Late	Early	Late
Male.....1929	29.5	70.5	47.0	53.0
1937	10.6	89.4	37.0	63.0
Female.....1929	32.0	68.0	34.8	65.2
1937	9.8	90.2	28.8	71.2

Statistics which are available show a steady fall in the institutional incidence of syphilis. In the Toronto General Hospital since 1929, the date of the first survey, the percentage of syphilis, as evidenced in routine Wassermann tests, has fallen from 3.2 per cent. to 1.7 per cent. In spite of this, the percentage of late cases of syphilis under treatment has steadily increased. This would suggest an increase in the late syphilitics and similarly a fall in the number of early cases of syphilis presenting themselves for treatment. It seems to me that if these conclusions are correct they are hopeful.

Syphilis and Gonorrhoea by Age and Sex

Since 1929 in both gonorrhoea and syphilis there has been a reduction in the percentage of cases under 14 years of age. In syphilis this percentage has fallen from 5.7 to 4.9 per cent, and in gonorrhoea from 2.6 to 1.8 per cent. These data are presented in tables IX and X.

TABLE IX

SYPHILIS AND GONORRHOEA BY AGE AND SEX, TORONTO, 1929, 1931, AND 1937

	Syphilis				Gonorrhoea			
Age	Male	Female	Total	Per cent.	Male	Female	Total	Per cent.
Under 14								
1929	80	90	170	5.7	5	51	56	2.6
1931	80	80	160	4.6	7	83	90	3.5
1937	90	88	178	4.9	3	42	45	1.8
Over 14								
1929	1580	1218	2798	94.3	1315	783	2098	97.4
1931	1905	1449	3354	95.4	1422	1068	2490	96.5
1937	1985	1476	3461	95.1	1682	822	2504	98.2
1929	1660	1308	2968	100.0	1320	834	2154	100.0
1931	1985	1529	3514	100.0	1429	1151	2580	100.0
1937	2075	1564	3639	100.0	1685	864	2549	100.0

TABLE X

SYPHILIS AND GONORRHOEA UNDER 14 YEARS OF AGE ACCORDING TO DISEASE, STAGE OF DISEASE AND BY WHOM TREATED, TORONTO, 1929, 1931, AND 1937

Treated by		Early		Late		Total
		Male	Female	Male	Female	
SYPHILIS						
Clinics	1929	18	22	42	50	132
	1931	20	16	40	46	122
	1937	10	3	63	64	140
Private phys.	1929	4	4	16	14	38
	1931	7	6	13	12	38
	1937	10	12	7	9	38
Totals	1929	22	26	58	64	170
	1931	27	22	54	57	160
	1937	20	15	70	73	178
GONORRHOEA						
Clinics	1929	1	14	0	22	37
	1931	2	37	0	17	56
	1937	0	9	0	20	29
Private phys.	1929	3	8	1	7	19
	1931	2	13	3	16	34
	1937	1	11	2	2	16
Totals	1929	4	22	1	29	56
	1931	4	50	3	33	90
	1937	1	20	2	22	45

SUMMARY

The total number of cases of syphilis and gonorrhoea reported through this survey in Toronto in May, 1937, was 6,188 in an estimated population of 645,462, a rate of 9.59 per thousand. There were 3,639 cases of syphilis and 2,549 cases of gonorrhoea, rates of 5.64 and 3.95 respectively per thousand population. Of the syphilis cases 2,075 were males and 1,564 were females, giving a percentage of 57 for males and 42.98 for females. Since the first survey in Toronto in 1929 the actual number of cases under treatment has increased, as has the rate. In 1929 the total number of early cases of syphilis reported was 909. The total number in 1937 was 403. The number of late cases reported in 1929 was 2,059. In the 1937 survey this number had increased to 3,266. In other words, there was an actual decrease in early cases of over 50 per cent. and an increase in late cases of more than 50 per cent. When one considers these figures with statistics showing a sharp reduction in the percentage of cases found in hospital wards by routine Wassermann tests, three conclusions are suggested: a decrease in late syphilis, better diagnosis of late syphilis, and an actual decrease in early syphilis.

The Lead and Arsenic Content of Canadian Domestic Tobaccos

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IN the United States and Canada the growing tobacco plant must be protected from insect pests such as the horn worm, the wire worm, the flea beetle, etc. So far the best protection has been afforded by the application of arsenate of lead, which may be sprayed on the plants as a mixture with water or applied with a dust gun mixed with an inert substance such as wood ashes, four and one-half to six pounds being applied to the acre (1). No successful substitute has been found so far for arsenate of lead. Paris green, another arsenic compound, is sometimes used in conjunction with arsenate of lead but is not as satisfactory as there is a danger of burning the tobacco plants and, due to its greater solubility in water, it washes off more quickly (1).

The insolubility of arsenate of lead ensures that after application it will remain on the plants long enough to kill any worms that may hatch later (1). This useful tendency of the arsenate of lead to adhere to the tobacco leaf, however, results in the relatively high lead and arsenic content found in the tobacco of commerce. The United States Department of Agriculture does not encourage the use of arsenate-of-lead sprays late in the growing season (2), but as tobacco does not come under the United States pure food laws, arsenic content as high as fifty times and lead content of almost 100 times the allowable limit in foods are reported, the U.S. tolerance being 1.43 parts per million for arsenic (as As_2O_3) and 2.57 parts per million for lead in foods (3).

The Possible Toxic Effect of the Lead-Arsenate Contamination of Tobacco

In the case of chewing-tobacco and snuffs it is evident that considerable amounts of the contained lead and arsenic may be released. Remington found that about 50 per cent. of the arsenic content of tobacco was water-soluble (4). Bauer and Ropes found only 30 parts per million of lead in samples of snuff suspected of causing lead poisoning (2).

In the case of tobacco burned in pipes, cigarettes, and cigars, there is more difficulty in evaluating the true effect of the lead and arsenic content. This is due to the fact that volatilized lead and arsenic are filtered through the unburned tobacco and the unvolatilized portion is retained in the ash. However, the lead and arsenic inhaled directly into the lungs (as from cigarettes) is absorbed directly into the blood stream and is potentially much more harmful

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than when ingested through the stomach (6, 7). Remington reported that about 50 per cent. of the arsenic is volatilized in smoking (4). Gross and Nelson found 32.2 to 41.3 per cent. volatilized, 11 per cent. of the total arsenic actually going to the lungs, stating that "moist absorbent cotton caught nearly all the arsenic. This fact is not reassuring when it is recalled that the tissues of the mouth and lungs are normally moist" (5).

The amount of lead in tobacco smoke merits discussion. Cadenhead and Jacques (8) investigated the possibility of lead poisoning through the accidental mixing of pipe tobacco with lead foil from the package. They found the equivalent of 76 micrograms of lead going into the smoke from 1/5 gram contamination in a pipeful. They stated that the strongly reducing atmosphere in the pipe bowl tends to lessen the amount of lead oxides formed, which are comparatively non-volatile. Unoxidized lead volatilizes at 360°C., and the temperature in the pipe-bowl they estimated as 300 to 500°C., hence the presence of volatilized lead in the smoke. Lead arsenate, however, presents a still greater hazard as it boils at 280°C. ($-H_2O$) (9).

There is apparently need for further investigation. One report gives 1/15th of the total lead present as being found in the inhaled smoke. The importance of small quantities of volatilized lead can be seen from the fact that the safe limit of lead in air breathed has been estimated to be from 0.15 to 0.6 mg. per cubic meter (10, 11).

The greater danger of inhaling lead as against its ingestion with food and drink has often been stressed. One authority states that lead inhaled and absorbed directly through the lungs is ten times as toxic as an equal amount take in through the stomach (7). The minute quantities of lead necessary to produce lead poisoning over a period of time are almost unbelievably small. In one well-known investigation, ingestion of only 0.1 milligram of lead a day brought on lead poisoning over a period of years (12). (0.1 milligram of lead is approximately the amount of lead left by a sharpened metallic lead point making a fine line about half an inch long on ordinary paper.)

Inhaled lead is absorbed into the blood and finally deposited in the bones (13), presumably as tertiary lead phosphate, injuring the organs as it passes through them. There is less than a gram of lead in the body of a man dying from chronic lead poisoning (14), this being equivalent to the weight of a lead shot slightly over 3/16 inch in diameter. It is interesting to note, however, that though less than one person in a million actually dies of lead poisoning directly, Lanza in discussing the insidious character of lead poisoning states (15): " . . . . . it may be well thought of as a counterpart of syphilis, not only in the variety of its effects on the human system, but in the manner in which it may be dormant and unsuspected in the tissues for years apparently inocuous, until some alteration in the metabolic processes liberates it with unimpaired venom. Like syphilis it is a contributing cause of many a death for which it does not receive its rightful share of the blame."

The subjective symptoms of a minute dosage, however, are those of general malaise. Porritt (16) describes symptoms of increasing lassitude due to the cumulative effect of minute dosages of lead. "Apparently lead puts a brake

on the metabolic processes—there is a strange feeling of lethargy as if a cloud had settled over [the sufferer]; he loses interest in life; everything is a trouble, a weariness of flesh and brain; lead has a selective action affecting certain people more than others." Dr. Porritt's symptoms were caused by only one part per million in his drinking water.

Another factor that must be kept in mind is the synergistic effect of lead and arsenic; that is to say, each increases the toxicity of the other.

Arsenic, though also stored in the body, is not held to the same extent as lead, the greater part being eliminated after about 70 days (13) though it has been found that the total amount of arsenic deposited in the body progressively increases with age. In an investigation of the amount of arsenic eliminated in human urine, Fordyce, Rosen and Myers (4) were often unable to explain the amount of arsenic found in terms of the amount in the food taken. Remington then showed that "the habitual user of tobacco is in daily contact with appreciable amounts of arsenic," and concludes that "the possibility of chronic arsenic poisoning from the use of tobacco is not to be dismissed without more evidence." (4).

In the famous Manchester beer cases hundreds were made ill and numbers died, but the maximum arsenic found in the beer analyzed was only four parts per million (4). Perhaps the most thorough of recent investigations of arsenic poisoning have been made at the New York Skin and Cancer Hospital. C. N. Meyers and Dr. Binford Throne report that mild cases of arsenic poisoning, usually unsuspected by either physician or patient, are frequent. Their investigations have shown that arsenic was the factor causing "bald spots" or patch baldness, and also loss of pigmentation and certain types of abnormal pigmentation of the skin. Earlier they had concluded that in about 30 per cent. of the patients suffering from eczema, arsenic was a factor of great importance. They attributed the arsenic largely to the increased use of arsenic spray for the destruction of insects.

EXPERIMENTAL

A number of commonly used brands of Canadian cigarettes were tested for lead contamination. The analytical method employed was a modification of the new dithizone test which has become the standard in the quantitative microanalysis for lead. Dithizone, a contraction of di-phenyl-thiocarbazone, also known as benzene-azo-thioformic acid phenylhydrazine, is an organic reagent suitable for the qualitative microdetection of unbelievably small traces of metals which has the distinction of being applicable quantitatively.

Dithizone in alkaline solution gives coloured precipitates with 19 metals. The carbon tetrachloride solution of dithizone is a rich emerald green, whereas the solution of the inner metallic dithizone complexes may be red, violet, orange, yellow, etc., according to the metal present. By the addition of potassium cyanide, all metals are kept from reacting except lead, stannous tin and thallous thallium.

The lead complex forms a beautiful ruby-red solution in carbon tetra-

chloride. Therefore, the presence of lead is shown by a colour change from green to red.

There are several difficulties peculiar to the analysis of cigarettes for lead. Ferric iron, commonly found in the ash of certain tobaccos, must be reduced to the ferrous state. Stannous tin, on the other hand, must be oxidized to the stannic state if present (due to contamination by tinfoil of the package). Furthermore, no oxidizing substance must be finally present as it would tend to discolour the dithizone solution.

The high percentage of phosphates of the calcium and iron groups in tobacco ash presented a distinct problem as the dithizone test must be carried out in alkaline solution in which these phosphates tend to precipitate, carrying down occluded lead, presumably as the phosphate. This last difficulty was obviated by the addition of sodium hexameta-phosphate as suggested by Cassil and Smith (2) which keeps the phosphates from precipitating for at least long enough to carry out the lead determination on tobacco ash.

The quantities of difficultly soluble alkaline earth and magnesium salts kept in solution by a given weight of sodium hexameta-phosphate $Na_6P_6O_{18}$ agree closely with the theory that the dibasic cation replaces two atoms of sodium in $Na_6P_6O_{18}$ (17). It has been suggested that sodium hexa-meta-phosphate ionizes to two sodium ions and a complex ion, $Na_4P_6O_{18}$, and calcium, as an example, is substituted for sodium in this, giving $Ca\ Na_2P_6O_{18}$ which is soluble (18).

The titrimetric dithizone method followed showed an accuracy well within 5 per cent. both by checks and by the addition of known amounts of lead.

It must be remembered that, due to the great number of sources of tobaccos, the lead content of individual brands must necessarily vary considerably from package to package. Therefore the following data should not be taken to represent the general average of lead contamination for any special brand of cigarettes, but merely that of the individual package tested. The results are presented in tables I and II.

TABLE I

LEAD CONTENT OF SOME CANADIAN CIGARETTES

Sample	*When Tested*	*Lead in parts per Million*
1	Jan. 6, 1937	19
2	Jan. 4, 1937	23
3	Jan. 4, 1937 Jan. 26, 1937	average 17.5
4	Dec. 29, 1936 Dec. 31, 1936	average 27.5
5	Dec. 21, 1936	20
6	Jan. 5, 1937	26
7	Jan. 14, 1937	22
8	Jan. 13, 1937	19
9	Jan. 6, 1937	25
	Average	22 p.p.m.

TABLE II

LEAD CONTAMINATION IN CIGARETTES COMPOSED OF PURE ORIENTAL TOBACCOS*

Sample	*When Tested*	*Lead in parts per Million*
1	Jan. 15, 1937	Trace
2	Feb. 12, 1937	3.8
3	Feb. 12, 1937	Negative
4	Feb. 9, 1937	Negative
5	Feb. 9, 1937	7
6	Feb. 2, 1937	3
7	Feb. 2, 1937	8
8	Feb. 22, 1937	Negative
9	Jan. 15, 1937	Trace
	Average	Less than 2.5 p.p.m.

*Pure oriental tobaccos according to Bogen (19), purchased in the United States.

The quantitative determination of the arsenic content in Canadian cigarettes will be reported in a later paper. In the usual lead arsenate spray used ($PbHAsO_4$), the arsenic (as As_2O_3) to lead ratio is approximately 1:2.1, though a comprehensive survey by U.S. Government chemists shows that due to the use of other arsenical insecticides the ratio rises to an average 1:1 ratio (2). It may, therefore, be safely assumed that the arsenic contamination (as As_2O_3) in the above cigarettes is roughly equal to one-half to the whole of the lead contamination in parts per million, corresponding to 11 to 22 parts per million of arsenic for the average lead values of table I.

SUMMARY

It has been shown that the lead and arsenic content of Canadian tobaccos is far in excess of that which would be tolerated in foods. In view of the possible ill effects from unlimited use of arsenate of lead on the tobacco plant, it seems logical that there should be government control of some kind, whether through the development of less toxic sprays or through the establishing of a safe contamination-tolerance.

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Sexual Sterilization in Alberta*

Eight Years' Experience, 1929 to May 31, 1937

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THE Sexual Sterilization Act for Alberta (1) was assented to on March 21, 1928, and the first cases under the Act were considered in the fall of 1929. The authority for the operation of the Act is a Board of four persons appointed by the Lieutenant-Governor-in-Council and known as the Eugenics Board. Two members of the Board must be medical practitioners, one nominated by the Senate of the University of Alberta and one by the Council of the College of Physicians and Surgeons. The other two members of the Board are persons other than medical practitioners, well known and of high repute.

Amendments (2) to the Sterilization Act were assented to on April 14, 1937. Whereas in the original Act the consent of the patient, parent or guardian, or order of the Minister of Health, was necessary in all cases, it is no longer necessary in the case of mental defectives. As before, in cases other than defectives, it is necessary to obtain the consent of the patient, if an adult, or the parent or guardian, if a minor, or, if married, of the other contracting party. In the original Act the danger of the transmission of the "defect" was the criterion. In view of the amendments, however, cases where procreation might be attended with "mental injury to the patient" may also be recommended for sterilization. In the original Act, also, the possibility of discharge from the hospital had a bearing on the case. It is no longer necessary that this be taken into consideration, and certain cases may be sterilized in which there is no likelihood of discharge from the hospital in the ordinary way.

All cases are presented to the Board on the recommendation of at least two psychiatrists. Prior to presentation to the Board, the cases are seen either in mental hospitals or in the mental hygiene clinics which are held at various points throughout the province. A concise summary is made of each case for presentation. The Board reviews the summary, examines the case, and authorizes the operation in writing. Cases fall within the general groups of "mental defectives", "convalescent psychotics", and "those suffering from mild mental disorders".

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Where consent is necessary the patients, or consenting parties, are interviewed or contacted by writing. The reasons for the operation are given and the nature of the surgical operation is explained. In former times, when the consent of mental defectives was necessary, it seemed most difficult to obtain that consent from the higher-grade defectives. It is not particularly difficult to obtain the consent of persons of normal intelligence. Where these individuals refuse, however, it is usually on such grounds as "not wishing to undergo a surgical operation", "believing that other equally effective measures to prevent procreation might be adopted" or "that the operation is not necessary". Strangely enough, the desire for more children is not commonly advanced as a reason for not desiring the operation. It seems somewhat more difficult to obtain consent from males than from females. The reason for this appears to be a subtle one, the male giving the impression that the operation would be a blow to his pride or vanity.

The operations at present are performed exclusively by two competent surgeons appointed by the Eugenics Board. The surgery is done, with few exceptions, in the surgical department of the Provincial Mental Hospital at Ponoka. Occasionally operations are authorized in general hospitals in other parts of the province. When the operations are performed at the Provincial Mental Hospital, Ponoka, the patients or relatives are under no expense whatsoever. If performed at other hospitals the patient, or his relatives, bear the expense. To date there have been two post-operative deaths, both females, one due to broncho-pneumonia, the other to generalized peritonitis complicated by a liver abscess. The results of the operations have been very satisfactory both from a social and psychiatric standpoint. Illegitimacy has been checked in a number of instances. Contrary to a common assumption, prostitution has not been furthered nor have there been any tendencies to sexual excesses in other respects. From a psychiatric standpoint, the curtailment of numbers in the family has lessened the stress and strain of family life, many being able to carry on in the home with what children they have had where there has been no worry of further pregnancies.

Subsequent to the operation one male case impregnated his wife twice. In the first instance it was thought that insufficient precautions were taken immediately following the operation and his discharge from the hospital. Authorities (3) on the subject are inclined to believe spermatozoa survive in the upper genital tracts for at least six weeks. Following the second pregnancy, however, the patient was subjected to a second operation. The vasa proved to be patent, for some unexplained reason, unless there had been an error in technique in the first operation.

From a psychiatric standpoint there was one interesting sequel to the operation. A single female who had had one depressed attack and who had recovered from it, developed a second depressed attack some time following the operation. Among other ideas, she believed that the operation had taken away her "womanhood". Her ideas concerning the operation, however, did not persist and she is now in the throes of a frank manic attack.

One married male, who had had numerous manic attacks and whose wife had had fourteen pregnancies, conception taking place usually during the patient's remissions, has been carrying along satisfactorily for some considerable time now. The family situation has been relieved as the pre-existing children have been growing up and there have been no new infants for which to care. It is interesting to note that the eldest daughter of this particular patient has already had one manic attack. Sterilization was recommended but she would not consent to the operation.

Two defectives, who had married and who had had one defective child, were sterilized some years ago. The husband has been in and out of gaols and mental hospitals for the past eight or ten years. The wife, however, was able to maintain herself up to the time of her death which occurred last year. The husband's father and mother were both in the Provincial Mental Hospital for some years. The father's condition was diagnosed manic-depressive psychosis, and the mother suffered from epilepsy. The wife's family history was obscure. It is only reasonable to suppose that repeated pregnancies would have occurred had they not been sterilized. It seems logical to assume that the burden to society has been materially diminished by the sterilization of these two defectives.

Since the passing of the amendments, it has been possible to sterilize a number of defectives from whom consent could not be obtained formerly.

The Eugenics Board has held eighty-six meetings to date. The meetings have been held in Edmonton, Calgary, Lethbridge, the Provincial Mental Hospital, Ponoka, and the Provincial Training School, Red Deer. Fifty of the meetings have been at the provincial institutions mentioned.

In tables I and II are presented the number of cases, their classification, and the number of operations performed. More detailed information is available at the Provincial Mental Hospital, Ponoka.

TABLE I

CASES PRESENTED, PASSED, AND OPERATED ON
1929 to May 31, 1937

	Cases passed	Operated on	Not operated on
Male	501	181	320
Female	507	335	172
Total	1,008	516	492

Note: Of the total 320 male cases not operated on, 117 have been discharged from institutional care. Consent could not be obtained in these cases. One hundred and eighty-seven of the male cases not operated on are still in a mental institution. Most of these are permanent institutional cases, although 50 of them, probably, will eventually undergo the operation. Of the 172 female cases not operated on, 77 have been discharged, consent not being obtained. Seventy-six of the female cases not operated on are still under institutional care and most of them are permanent institutional cases. Of the total male cases 36.1 per cent. have been operated on; and of the total female cases, 66.1 per cent.

TABLE II

CLASSIFICATION OF CASES PRESENTED AND OPERATED ON
1929 to May 31, 1937

	PRESENTED		OPERATED ON	
	Male	Female	Male	Female
Psychoses and mild mental disorders	276	220	73	107
Mental deficiency (with or without psychoses or epilepsy)	218	277	104	223
Other conditions*	7	10	4	5
Totals	501	507	181	335

*Such as epilepsy without psychosis or mental deficiency; of normal intelligence but having had several mentally-deficient children, etc.

In conclusion, the work of sterilization in the province of Alberta has been carried on very quietly and efficiently and the results have been pre-eminently satisfactory.

REFERENCES

(1) The Sexual Sterilization Act, Chapter 37, Statutes for Alberta for 1928: "The Sexual Sterilization Act".
(2) Amendments, Chapter 47, Statutes of Alberta for 1937: "An Act to Amend the Sexual Sterilization Act".
(3) Authorities: "How Soon after Vasectomy Does a Man Become Sterile?", Medical Critic and Guide, 1935, *33*: 103. Editorial by W. J. Robinson, Ph.G., M.D.

Prenatal Nursing Supervision*

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PRENATAL supervision was adopted in Canada as part of our community public health nursing program about twenty years ago.

We started off with the usual high hopes, enthusiasms and preconceived ideas of the results that would be attained, that characterize so many efforts in new fields in public health work.

I think we all agree that in our general community program these hopes have not been realized. Our enthusiasm has been rather spasmodic and after twenty years' experience we are becoming more analytical of the results which are attainable. The latter attitude, possibly, is due to the fact that in recent years the money cost has loomed so large in our planning, and it is increasingly necessary to demonstrate actual rather than possible results.

First in our preconceived ideas of the value of prenatal care was the belief that preventable maternal mortality, still-births and neonatal deaths would be reduced at least by one-half; and second, that the community would accept this type of care as they accepted other means of health protection.

Before discussing the adequacy of our prenatal program it is desirable to state briefly our present situation in Canada as it relates to maternal mortality. In general the trend of maternal mortality has been upward rather than downward. In Montreal the maternal mortality rate for 1936 was 5.24 as compared with 4.95 in 1935. There has been a decrease in still-births and the rate of neonatal deaths has been reduced from 45 in the period 1926-1930 to 35 in the period 1930-1934. However, this reduction compares unfavourably with the marked reduction in the rate for the other eleven months of infant life. As members of the public health nursing group, we all agree that prenatal care has not been generally accepted by the community.

Explanation may in part be found in such important factors as the lower birth rate and the more accurate certification of causes of death, which automatically increase the mortality rate in these groups. Nevertheless, as Dr. J. T. Phair stated in his report of a study of maternal deaths in Ontario, published in 1934, our failure has been real and not apparent.

Of particular interest to the public health nursing group is the fact that the value of the public health nurse in the field of prenatal care is being questioned. In attempting to analyse a failure it is sometimes helpful to consider our successes. We recall the reduction or practical elimination of certain diseases, the reduction in infant mortality, and the increase of thirteen years in life expectancy since 1900. These are striking successes. In them the public health nurse has had an important part and it is realized that the success is due to general rather than specific service as rendered by the public health nurse.

**Presented by Miss Mary S. Mathewson, Reg.N., Assistant Director of the Child Welfare Association, before the Public Health Nursing Section at the Twenty-sixth Annual Meeting of the Canadian Public Health Association, Ottawa, June, 1937.*

If we consider the factors responsible for these results, we find that the majority of accepted measures for health protection relate to the community as a whole. The community has accepted the necessity for the protection of water, milk, etc., for the group; the mother has accepted health supervision for the infant; the school health service, for the school child; industry for the protection of its workers; and the insurance company for its policy-holders. However, there are as yet comparatively few individuals who have accepted measures or practices, other than those of a curative nature, to promote their own individual health.

Prenatal supervision falls within this category. It is still looked on by the majority of mothers as directed to themselves as individuals; they have not accepted the idea that the infant is nine months old when it is born. Even a short time spent by a public health nurse in one of the poorer districts, frequently hearing of self-induced or attempted abortions, will prove the truth of this statement.

Why has prenatal supervision failed as a community measure? And have we expected too much of it? Sir George Newman stated as recently as 1932 that half the maternal deaths were preventable. Surgeon-General Thomas Parran, in his Mother's Day address to the Maternity Centre Association, New York City, this year, estimated that two-thirds were preventable. Both stressed the importance of prenatal care. The Maternity Centre claims, from a study of 10,000 cases, that prenatal care has reduced the maternal deaths by 50 per cent. and the infant mortality by 60 per cent.

The Victorian Order of Nurses in Canada, the organization that has been most consistent in its prenatal nursing-supervision plan, records a maternal mortality rate of only 1.8 among the cases attended by their nurses. It is almost impossible to allocate the credit between prenatal supervision and confinement with adequate post-confinement medical and nursing care.

Conditions which are Impeding Progress

The economic factor is of primary importance. Dr. S. Boucher, Director of the Department of Health of Montreal, stated in a recent survey of this subject that the increase in illegal abortions is the chief cause of the increase in the number of maternal deaths. Surgeon-General Thomas Parran has pointed out the important part played in the increased number of maternal deaths by late marriages and the one-child families.

It is recognized by public health nurses that one-child families are the most difficult to reach with any program of prenatal supervision. The nurse has no organized means of contact with such families. Community education as relating to these matters has been spasmodic and such literature as has been distributed has usually been to those who have specifically requested help. Yet, as we all know, this is the most important group to reach.

Attempted abortion and the unwanted child are the concern of every public health nursing staff. To interest a woman in proper care when her one hope is that she will not bear another living child is a difficult task. We cannot even persuade her of the importance of proper care by "fear", a method which

many of us feel has been stressed far too much in prenatal education. The economic fear of the prospective mother is greater than the individual fear for her own health.

Public health cannot accept the responsibility for economic security, yet any nurse attempting to direct a public health nursing organization must feel at times that the field staff certainly think that we should do something about it. The result has been that in our attempts to provide even some measure of temporary security for our families we have disregarded our plan of co-operation and brought, possibly, just criticism from the social workers' group.

Sir Evelyn Wrench, editor of the London Spectator, speaking in Montreal recently, said, "What Canada needs is larger families and State aid for maternity." On the other side we have the advocates of limitation and the better spacing of children by means of birth control. I have neither the information nor the ability to discuss either plan.

If we agree that our present social conditions are one of the most important factors in the cause of maternal deaths and also agree that we cannot as a group provide security for expectant mothers, that State aid in Canada is largely confined to the provision of hospital care and that birth control is not generally accepted as part of our public health program, what can the public health nurse do to improve conditions incident to the period before child-birth?

What We Can Do

We must have a more definite and consistent program and a realization that prenatal care has a social and mental as well as a physical aspect. We cannot hope in the months of pregnancy to compensate for the neglect of health during the previous years. Even the attempt made to prepare the school girl for homemaking and future parenthood was one of the first things dropped in the majority of places in Canada, when economic pressure came.

Little or no organized effort has been made to reach the late adolescent group of boys or girls, either to interest them in the promotion of their own individual health or prepare them for marriage and parenthood. There is no group who have a better opportunity of knowing the result of this neglect and consequent ignorance than we have as public health nurses. If we cannot act ourselves, I think that we should be somewhat more vocal in an effort to see that some action is taken.

The average life of a young mother in the lower economic sections of the city of Montreal, and this is equally applicable to many other places, is not conducive to her welcoming parenthood. Would not the provision of nursery schools, possibly community nurseries—in fact any method of giving the mother some time to be an individual, to have more recreation and, what is even more essential in the prenatal and neonatal period, some time for rest—change at least part of her mental attitude toward maternity, even under existing conditions?

The Child Welfare Association of Montreal has recently completed a study, under the direction of Dr. J. C. Meakins, to determine the prevalence of anaemia in mothers attending our well-baby clinics. Over 3,000 blood

examinations were made and more than 1,500 women were included in the survey. The findings of the study are not complete but more than 30 per cent. of these mothers showed a degree of anaemia that would make it difficult or impossible for them to function normally in the home. Although there was no obvious relationship with pregnancies, their number or spacing, the study indicates that there is a consistent lack of knowledge concerning food, as well as, in many instances, lack of proper food. While this would seem to show that anaemia in women of child-bearing age is not a problem that can be solved during the period of pregnancy, we realize that this condition will affect the health of the mother and possibly the child. Speaking at a mother-saving campaign meeting, Mrs. Stanley Baldwin said she believed that faulty nutrition had a great deal to do with deaths of mothers. More emphasis, therefore, should be placed on the teaching of nutrition.

We are told that congenital syphilis is one disease that can be prevented, if treatment of the expectant mother is started before the fifth month of pregnancy. Surgeon-General Parran stated recently that one out of every sixty babies born in the United States carries the germs of syphilis in its body. The responsibility of the public health nurse certainly is to see that at least before the fifth month every pregnant woman known to her, presents herself for examination by a physician.

Many of the toxaemias of pregnancy, one of the greatest causes of maternal deaths, and probably of neonatal deaths, will respond to good prenatal care. We think that the nurse can be utilized to an even greater extent than our she has in the supervision of this condition. A survey was made recently by own association in conjunction with the Royal Victoria Montreal Maternity Hospital, of the effect of toxaemia in the mother on the health of the child. Of 208 babies referred for study, 96 were followed through to the end of the first or second year of life. Only four deaths occurred: one three days after birth; one at two months, of pneumonia; one at four months, cause of death given as prematurity; and one at nine months, of malnutrition. This would seem to indicate that toxaemia in the mother does not affect the child to the extent we thought.

Our first responsibility in direct prenatal nursing supervision is to make a contact with the expectant mother and see that she is under the care of a physician at the earliest possible time. It is not my intention to attempt to cover the content of such nursing care. If, for economic reasons, the service of a private physician is not indicated and clinic service is used, every effort should be made by the nurse to make this service attractive and comfortable. Full advantage should be taken of the opportunity for positive health education. I do not think it is unfair to state that much of the success of prenatal clinics, as judged by attendance, is due to a desire for care at confinement rather than an appreciation of its value as a preventive measure.

Supervision in the home and the clinic calls for a much more adequate knowledge of mental hygiene than we have as a group, if we are to deal with problems which, if not actually dependent on pregnancy, so often present themselves at this time.

We come finally to what we think is our greatest need in prenatal care and that is a planned and consistent program of community education. We frequently deplore our lack of facilities, yet we have in Canada, as you all know, a national public health nursing organization, the Victorian Order of Nurses, equipped to serve to an even much greater extent than they have in the field of prenatal care if the demand for this service and the financial support are forthcoming. Certainly in urban centres at least we have a sufficient number of physicians and for the most part fairly adequate hospital accommodation if used to the best advantage. The Canadian Welfare Council and other organizations have available literature on prenatal care. Yet the community has not taken full advantage of these resources. Group education of parents in this field, as in others, is still in its infancy. Fathers as well as mothers must be taught the measures necessary to protect maternal and child health.

If the value of the public health nurse in the field of prenatal care is doubted, it is not because the opportunity to prove her value is lacking. Our viewpoint may have been too narrow and the difficulties discouraging; nevertheless, there has been a measure of success.

If you feel that this attempt to discuss prenatal nursing supervision has been too general, this has been due to the fact that I believe the chief value of what is technically known as such is its direction toward better medical and nursing care at confinement. The prenatal period doubtless has certain nursing responsibilities but its successful termination in lower mortality and morbidity rates and in the happiness and positive health of mothers and babies depends largely on our general public health education and supervision program at least from birth to the end of the child-bearing period.

Puerperal Sepsis and Its Prevention*

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PART II‡

PREVENTION

General Measures

Diet. In view of the possibility that shortage of vitamin A in the diet might render women abnormally susceptible to infection, Green et al (51) have investigated the effect of adding vitamin A to the diet of pregnant women. The incidence of infections in the puerperium is stated to have been reduced.

Sterilization of the Genital Tract. Although it would seem improbable that preliminary treatment of the vagina with antiseptics could prevent exogenous infections, such treatment might conceivably cleanse the vagina of the anaerobic streptococci. Colebrook and Maxted (52) were unable to show that the application of antiseptics to the vaginal mucous membrane was of any value.

Marital Intercourse before Delivery. It has been frequently suggested that marital intercourse during the period immediately preceding delivery is a potent cause of infection. There is considerable doubt whether this can be so in view of the fact that in some hospitals sepsis is very nearly negligible without, so far as I am aware, the patients being warned against this practice during the antenatal period.

Measures Designed to Prevent Ingress of the Organisms

Because the possible sources whence haemolytic streptococci, anaerobic streptococci, and coliform bacilli may come are so different, it is obvious that the routes by which they reach the tissues and the measures necessary for preventing their ingress must also be different. It is therefore necessary to discuss them separately.

Haemolytic Streptococci. The observation that group A strains are not present in the vagina before delivery shows that infections of the uterus must be exogenous in origin. On the other hand, we do know where group A strains are most likely to be found in nature and there is evidence that the principal sources whence they are derived in puerperal cases are the nasopharynx of attendants or the woman herself, and septic foci in the members of her family

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‡Part I was published in November issue (page 554).

or herself. The actual route by which the organisms reach the genital canal must therefore be considered:

A. Organisms derived from a pre-existing infection in the neighbourhood:
Air-borne infection. Transfer by instruments or hands. Infection of nasopharynx of patient and transfer as under C below. Contamination of hands of patient and touching the vulva.

B. Organisms derived from the nasopharynx of an attendant:
Direct droplet infection. Direct or droplet infection of the hands of the attendant. Droplet infection of the throat of the patient and transfer as under C to the genital tract.

C. Organisms derived from the nasopharynx of the patient herself:
Transfer by contamination of the hands and touching the vulva. Passage of organisms to the faeces and subsequent contamination of the vulva during delivery. Passage of organisms by way of the blood stream to the placental site. Contamination of the air and transfer by air currents.

D. Organisms derived from the hands of the attendant:
Direct transfer to the vulva.

E. Organisms derived from the hands of the patient:
Direct transfer to the vulva.

Consideration will show that any of these routes is possible. No one measure can be advocated for the prevention of these infections. Each of the possible routes may, however, be blocked but this is a problem in obstetrical technique. The cardinal points in such technique should be: (1) avoidance of delivery in a contaminated atmosphere such as a home or hospital in which any type of infection is being nursed; (2) abstension from midwifery when the obstetrician or nurse is suffering from a nasopharyngeal infection of any sort; (3) prevention of droplet infection from the nasopharynx of carriers to hands or vulva by adequate masking and, probably of more value, the avoidance of talking during delivery; (4) scrupulous attention to the toilet of the hands, the wearing of gloves, and an adequate antiseptic technique;* and (5) warning the patient against touching the vulva.

It must further be pointed out that infection may not necessarily occur at the time of delivery but some time later, for which reason visitors and the personnel of the lying-in ward should also be subjected to the same discipline as the personnel of the delivery room.

Specific methods of prevention at present available, such as immunisation with vaccines, toxin or antitoxic sera, cannot be advocated.

The administration of Prontosil or sulphanilamide in cases where an infection is particularly to be expected may be of value but can hardly be considered as a routine measure in every case, for these substances do not invariably cure an infection, and such a practice as a substitute for an adequate technique is to be deprecated. These drugs should be reserved for patients who are known to have a haemolytic streptococcal infection such as tonsillitis at the time of delivery.

Anaerobic Streptococci. It has already been pointed out that the anaerobic streptococcal infections are probably endogenous in origin, seeing that no common exogenous source is known, that they are present in the vagina of 50 per cent. of women before delivery and that they usually follow intrauterine interference during delivery. It would therefore seem that the only method at present available for their prevention is the avoidance of intrauterine inter-

*See Colebrook and Maxted (52) for a consideration of this matter.

ference during delivery by adequate antenatal supervision and obstetrical technique during delivery.

B. coli. That the organisms are probably derived from the faeces would appear to be highly probable. Infections with this organism would therefore appear to be preventable given a sufficiently adequate toilet of the vulva before delivery, the emptying of the rectum, and care not to contaminate the vulva with faeces during delivery.

IMMUNITY

It is frequently assumed that the immunity of women who become infected was below par before delivery and so rendered them abnormally susceptible to infection. There is very little evidence in support of this. In the first place some maternity hospitals have an almost negligible amount of sepsis in spite of the fact that they draw their patients from poor districts where underfeeding, lack of vitamins and intercurrent diseases are rife (Oxley, 53).

In the second place, direct estimations of immunity lend little support to this thesis. Such estimations have for the most part been carried out on immunity to haemolytic streptococci and indicate that the immunity of infected persons is as good as that of the normal person, if not better. Immunity to anaerobic streptococci is still completely uninvestigated.

Taking the bactericidal power of the blood of already-infected patients for the homologous strains of haemolytic streptococci as an index of immunity, Hare (54) has shown that when determinations are made as near the start of the infection as possible the immunity is usually either as good as that of normal blood or better. This applies to a high proportion of fatal cases as well as to cases which eventually recover. It has also been shown by Kenny and Colebrook (55) that in a series of 100 cases of haemolytic streptococcal infection only 19 were without antitoxin as indicated by a positive Dick-reaction when tested during the first few days of the infection. This figure corresponds closely with the figures (18 per cent. and 14.4 per cent., respectively) given by Heller (56) and Zingher (57) for the adult population generally.

During an infection the immunity of the host changes in a number of respects. Thus Hare (54) has shown that in localised infections the bactericidal power of the blood may increase as the illness proceeds but this increase may not occur and in any event is frequently not apparent until late in convalescence. In cases with invasive infections, the blood undergoes a marked increase in bactericidal power and while this is most marked in cases which eventually recover it is also seen in fatal cases if the patient lives long enough for the necessary immune response to be made. Similar results have been reported by Fothergill and Lium (58) in scarlet fever and by Spink and Keefer (59) in erysipelas.

Examination of other antibodies such as antihaemolysin (60) and antifibrinolysin (61) also indicates that the response in localised infections tends to be delayed and weak but accelerated and strong in invasive infections.

It would therefore seem that the immunity mechanism of these patients is not at fault.

On the other hand, there is some evidence that the varying severity of infections is due to variations in the "virulence" of the organisms because Hare (62) has shown strains which are saprophytic are usually unable to resist the bactericidal power of normal human blood whereas strains from invasive infections are usually able to resist its bactericidal power. Strains from localised infections behave in an intermediate manner. Probably the quality of the organisms which reach the tissues determines the severity and possibly even the eventual outcome of the infection rather than the immunity-mechanism of the host.

DISCUSSION

Maternal mortality and morbidity, both of which present little evidence of decrease in civilised countries in spite of the improvement in the general health, continue to cause grave concern, not only to obstetricians but also to governments. The principal reaction so far as the latter are concerned has been to institute elaborate statistical enquiries into the causes of death and disablement in childbirth. Many reports on these investigations have now been published comprising, in the aggregate, the statistical study of an enormous number of cases. It must be said, unfortunately, that they have not contributed very much to the solution of the problem. They have merely defined it and its extent but have given little or no indication of how improvement may be obtained.

In the case of puerperal infections, bacteriological research has, however, given somewhat more assistance. We now know that the haemolytic streptococcus is responsible for 39 per cent. of the severe cases and for 69 per cent. of the deaths which are due to infection. Second in importance are the anaerobic streptococci which are responsible for 29 per cent. of the cases and for 8 per cent. of the deaths. Third in order of importance are the coliform bacilli responsible primarily for pyelitis and cystitis which comprise about 20 per cent. of the pyrexias associated with childbirth and also for a proportion of uterine infections.

There is now an overwhelming body of evidence showing that the haemolytic streptococci causing puerperal infections are of exogenous origin and derived in most instances from the nasopharynx of an attendant at the time of delivery, occasionally from the patient's own nasopharynx and more rarely infection of some kind in the home. On the other hand, the anaerobic streptococci are probably of endogenous origin derived from organisms present in the vagina before delivery which are introduced into the uterine cavity by intrauterine manipulation during delivery. The coliform infections are almost certainly derived from the bowel.

The probable routes by which the organisms reach the genital tract have been enumerated and that ingress of the organisms in many instances could have been prevented by an adequate obstetrical technique during and after delivery cannot be doubted.

There is also no evidence that the immunity mechanism of infected patients was below parity before delivery, rendering them abnormally susceptible to infection.

Thus prevention of much puerperal sepsis would seem to be possible of achievement.

The Responsibilities of the Obstetrician

(1) Intrauterine manipulation should be avoided by every possible means not only because of the obvious danger of introducing organisms from outside but also because of the danger of lighting up an infection by anaerobic streptococci already present in the vagina.

(2) The very considerable danger involved in practising midwifery when suffering from a nasopharyngeal infection of any kind until such infection has been proved to be associated with organisms other than haemolytic streptococci of group A is brought out by the fact that in no less than 20 per cent. of D. Colebrook's series of cases the infecting organisms were probably derived from an attendant who was suffering from a nasopharyngeal infection at the time of delivery.

(3) That about 7 per cent. of healthy normal persons carry haemolytic streptococci of group A in the nasopharynx shows that unless great care be exercised an apparently normal attendant may cause infection. Equally it must be remembered that about 7 per cent. of patients going into labour may likewise carry potentially pathogenic organisms in their own nasopharynx which may by a diversity of routes find their way into the genital tract.

(4) That about 3 per cent. of persons selected at random carry haemolytic streptococci of group A on the hands, and that it is highly probable that persons who have a nasopharyngeal infection or who are nasopharyngeal carriers may also carry them on the hands, demonstrates the extreme importance of adequate sterilization of the hands of the accoucheur and nurse, and the advisability of wearing gloves whenever possible. Furthermore, care must be taken that the hands or gloves remain uncontaminated throughout the longest of confinements. Incidentally, many antiseptic solutions used in midwifery are much too weak or are not commonly allowed to act for a sufficient period to permit of destruction of haemolytic streptococci (Colebrook and Maxted, 52).

(5) In view of the fact that the patient may herself carry potentially pathogenic haemolytic streptococci on the hands, or may contaminate them from her own nasopharynx, the advisability of warning the patient against touching the vulva (a very common practice) before, during or after delivery is obvious.

(6) The demonstration that haemolytic streptococci may be present in the atmosphere in the neighbourhood of infected cases shows the very considerable risk entailed in carrying out obstetrical operations in small hospitals or homes where infected cases of all kinds may also be present. In addition to scarlet fever, tonsillitis, erysipelas and puerperal fever, otitis media and impetigo, many infected wounds and burns, cellulitis, and whitlows may also

be due to haemolytic streptococci. Yet in small hospitals many of these latter are frequently nursed in the near neighbourhood of midwifery cases.

(7) In poor or isolated districts it is frequently the practice for a nurse or doctor to attend many of the infections enumerated under (6) as well as midwifery cases. The considerable risk entailed is only seldom realised. Similarly there is great risk, all too frequently run in hospitals both great and small, in allowing a nurse to come direct from nursing cases with infections to take duty in the lying-in ward.

(8) Confinements in isolated communities and in the homes of the poor frequently require that the doctor should administer an anaesthetic as well as carry out obstetrical operations. A moment's consideration will show the dangers involved if his hands become contaminated with the saliva or nasal secretion of a patient who at the same time may be infected with, or is a carrier of haemolytic streptococci.

(9) It is not sufficiently often realised that a member of the patient's family may convey infection to the patient during the lying-in period, for which reason anyone suffering from a nasopharyngeal infection or such apparently trivial infections as impetigo, otitis media and the like ought to be rigidly debarred from entry to the lying-in ward or bedroom.

It may be argued that to eliminate many of these possible sources of infection from the neighbourhood of the delivery-room or lying-in ward is too much to expect in view of the difficulties under which much midwifery must be carried out. Nevertheless puerperal infection will undoubtedly not diminish until these dangers are recognised and eliminated.

That this can be achieved in a poor community with very little in the way of material resources is proved by the experience of such hospitals as the East End Maternity Hospital which draws its patients from one of the poorest districts in London. This hospital over a period of four years (1925-1929) delivered a total of 10,376 women, about half of whom were attended at home. The great majority of the cases were delivered by pupil midwives. The cases were quite unselected and no patients were transferred to other hospitals except for intercurrent disease. There were 10 deaths in this period, only four of which were due to sepsis, giving a sepsis death rate of 0.03 per cent. Only 116 or 1.1 per cent. of the cases had pyrexia, 37 of which were due to puerperal sepsis, so that the hospital had a sepsis rate of 0.35 per cent. (Oxley, 53). D. Colebrook (25) has also shown that at the same hospital during the years 1932-1933, when every febrile case was examined bacteriologically, only one case of haemolytic streptococcal infection was detected in the 1892 cases delivered, giving an attack rate of 0.05 per cent. These rates are not only much lower than the rates for the majority of maternity hospitals and for Great Britain as a whole, but they are also far below the rates for the boroughs from which most of the cases were derived.

Thus although the population dealt with was fairly uniform in composition, sepsis was almost negligible in the hands of the hospital midwives, whereas it was far greater in the hands of the unattached doctors and midwives working in the same area. The inference is inescapable: that in some

points the technique of the hospital was superior to that of the others practising obstetrics in the same area. In what respect this technique was superior cannot be discussed here, nevertheless it is undoubtedly technique and technique alone which can obtain results of this type. And from what we know now it will only be by strict attention to details of technique that puerperal sepsis will ever be materially reduced.

The Responsibilities of the Public Health Authority

While it is improbable that merely by legislation or the spending of public money, puerperal sepsis will ever be eradicated, much assistance can be rendered by an enlightened public health program. In Great Britain, for instance, the following facilities are provided by the majority of municipalities free of charge:

(1) Adequate assistance during delivery for even the poorest patient by a competent physician or midwife who in case of need can call on the services of an obstetrical specialist without charge to the patient.

(2) Rapid reporting of infections to the local health authority (employing a more precise definition of puerperal infection than is employed in any of the provinces in Canada), the provision of skilled attention if necessary and of hospital beds for the more serious cases.

(3) Rapid examination of throat and cervical swabs from doctors, nurses and patients with, in many instances, the determination of the group of any haemolytic streptococci which may be found.

(4) Replacement of midwives and nurses who are infected or carriers, or who have been in contact with infected cases of any kind.

(5) Adequate provision for the isolation of midwifery cases from infected cases in hospitals.

(6) Facilities for the removal of women who would otherwise be delivered in an infected hospital or household to clean surroundings.

But in addition, much may be done by an educational program comprising the following points:

(1) Better education for students and nurses in the technique of delivery in homes and difficult surroundings, as well as in the knowledge of the etiology of infections which is now available.

(2) Education of physicians already in practice by lectures, demonstrations and refresher courses.

(3) Education of hospital matrons and nursing superintendents in the part they should play in the elimination of infections from hospitals by control of carriers and infections amongst the nursing personnel.

(4) Education of the public to take advantage of the facilities for antenatal examination now available and in the preventable dangers attendant on midwifery in the home.

(5) Education of legislatures in the necessity for the provision of funds for the delivery of necessitous mothers, for skilled obstetrical assistance in case of need and for the isolation and care of infected cases.

In addition to the responsibilities of the obstetrician and the public health authority, the nurse, the patient herself and the members of her family also have their responsibilities, many of which I have referred to above; and unless all are prepared to assume their responsibilities, puerperal sepsis is not likely to diminish materially in the future.

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EDITORIAL SECTION

PURIFICATION OF SCARLET FEVER STREPTOCOCCUS TOXIN: A NEW ANTIGEN

IN a recent number of the Public Health Reports, issued by the United States Public Health Service, a method of purification of scarlet fever streptococcus toxin and results of its antigenic value are described by M. V. Veldee, Surgeon, U.S.P.H.A. This article is of significant importance. It brings into focus not only the matter of active immunization against scarlet fever but also the fact that a new type of antigen from streptococcus toxin has been developed. Improvements in scarlet fever antigen for active immunization have been long overdue. There have been virtually no changes in scarlet fever toxin and its use as a prophylactic since it was first described more than ten years ago. One may presume that relatively little research has been going forward in this important field. This is in sharp contrast to the situation in diphtheria antigens where much valuable research in many laboratories the world over has been pursued. The challenge has been taken up by Veldee and he has offered what appears to be a signal and novel improvement in the preparation and use of scarlet fever antigen.

Virtually the only important contributions in the last ten years which have been made in scarlet fever toxin as an antigen are that, firstly, a method for the preparation of a very much stronger toxin has been developed by both American and British workers using a tryptic digest broth with the substitution of the N.Y. 5 (Dochez) strain for the Dick strains; secondly, various effective means of purifying or concentrating the toxin. Much, however, remains to be done.

Veldee's contribution is important because he has apparently accomplished four things. Firstly, the number of doses has been reduced from five to three. This of course is not an improvement unless wider experience shows that the level of response is as high and the per cent. rendered Dick-negative as great as with five doses, and that the duration of the Dick-negative state is as lasting. Secondly, the doses may be given intracutaneously. One expects that more children will submit to vaccination by the intracutaneous route than by the subcutaneous. Thirdly, the antigen is purified and very much concentrated. Fourthly, the antigen is in a relatively insoluble form. Possibly this last im-

provement is the most important and makes the other improvements possible. The fact that an insoluble antigen has been developed without resort to the undesirable features attendant upon the use of alum may result in the application of this method to other antigens. The way of improvements of antigens lies in the direction of purification, concentration, and increased antigenicity. Many a "field day" is in store for the chemist. Meanwhile, it is to be hoped that more extensive and wider use of the new streptococcus antigen developed by Veldee will bear out the promising results that he has reported.

D.T.F.

A SURVEY OF THE INCIDENCE OF VENEREAL DISEASES IN TORONTO

A SIGNIFICANT contribution to our knowledge of the present incidence of venereal diseases has been made by Dr. Gordon Bates and those responsible for conducting a recent survey in Toronto. The findings of the survey are presented in this issue. The co-operation of the profession made possible the survey, 97 per cent. of the physicians replying.

The total number of cases of syphilis and gonorrhoea reported under treatment was 6,188, a rate of 9.6 per thousand of the population. In 1931 the rate was 9.7 and in 1929, 8.4. The rate for Toronto is considerably less than the rate obtained in similar surveys in a number of cities in the United States. Of the total number of cases in 1937, 3,639 were cases of syphilis—a rate of 5.6 per thousand. This rate is definitely higher than the rate for 1929, which was 4 per thousand. In 1929 the rate for gonorrhoea was 3.5 and in 1937, 4 per thousand. There has been, however, little change in the rates of these diseases from the rates of 1931.

A finding of special interest is the marked reduction in the number of early cases of syphilis under treatment, which is approximately one-third of the number reported in 1929. Only 10 per cent. of the cases are cases under early treatment. This may reasonably be interpreted as indicating a definite decrease in the number of cases of syphilis.

These findings, together with such data as are available concerning the incidence of syphilis as reflected by routine Wassermann tests of public-ward patients in general hospitals and institutions, are distinctly encouraging. In the Toronto General Hospital since 1929 the percentage of patients having a positive Wassermann test on admission has fallen from 3.2 per cent. to 1.7 per cent.

This survey is further evidence that the present venereal-disease program is effective, and while a survey in one city does not prove that similar conditions exist in the whole of Canada, it is at least suggestive. There is an urgent need for further surveys in Canadian cities. It is only through the co-operation of the Dominion Government with the Provincial Departments of Health that the incidence of venereal disease can be more rapidly reduced. The problem as it exists must be recognized and its solution calls for Dominion-wide co-ordinated effort.

REPORTS FROM THE ANNUAL MEETING*

Part VI

FIRST REPORT OF THE SUBCOMMITTEE ON STILLBIRTH REGISTRATION AND CERTIFICATION

IN the third annual report of the Committee on Certification of Causes of Death, it was recommended that a special subcommittee be appointed to undertake further work indicated in connection with the registration and certification of stillbirths.† This program was approved at the last annual meeting.

Two immediate objectives were defined by the subcommittee:

(1) The drafting of a suitable form for the registration of stillbirths, such to include all necessary and pertinent civil and medical data and to *serve as a basis for the discussion* of a schedule which might be recommended for national use;

(2) The further consideration of the character of a "workable scheme for the classification of the causes of stillbirth" which would be relatively simple, yet scientific and practical, reflecting throughout the fundamental objective of medical mortality records, i.e., the nature of the "underlying causes" of foetal death.

During the past year, extensive work has been done by the Committee along these lines. For convenience the report and findings will be presented in two sections dealing respectively with the two main phases of the Committee's work.

I. Suggestions Concerning the Form and Content of a National Stillbirth Certificate

General agreement has now been reached among the provinces as to the desirability of a single stillbirth registration form which would replace the present rather cumbersome double registration system. Furthermore, there is a considerable body of opinion favouring the early initiation of this scheme. With these facts in mind the committee carefully studied the whole problem of stillbirth registration and certification and in particular those stillbirth certificates now in use. The findings of the committee as a result of these researches indicate the need of establishing a clear understanding of what the ultimate purpose of such an official form is to be.

**Presented at the Twenty-sixth Annual Meeting of the Canadian Public Health Association, Ottawa, June, 1937.*

†Throughout this report, the word "stillbirth" is understood to mean a foetus born after 28 weeks or 6½ months of pregnancy, measuring not less than 35 cm. from the crown of the head to the sole of the heel, in which pulmonary respiration does not occur.

The following guiding principles were laid down at the outset:

(a) Since a special stillbirth certificate would replace registration of foetuses falling into that category (or otherwise provided for in provincial Vital Statistics Acts) as births and as deaths, all data now included on either of these two forms should be included.

(b) Since the present particular interest in such records is not alone from the viewpoint of incidence, but in respect to medical data on causes of death, special concern should be attached to the medical section of the certificate. Furthermore, whatever data are to be considered for inclusion in the medical section should be of a practical nature and be such as "not to put too great a burden upon the medical profession."

(c) Since the Committee on Certification of Causes of Death has approved the underlying principles embodied in the report of the Subcommittee on Causes of Death of the League of Nations Health Committee in 1925, in recommending for national use a medical certificate similar to the one suggested in that report; and since the certificate now in use throughout Canada embodies these principles and is proving its efficacy more each year, it is desirable that the questions relating to cause of death on a national stillbirth certificate be similar to if not identical with those on the present standard death certificate.

Stillbirth Certificates in Use Elsewhere

In Switzerland stillbirths were registered as both births and deaths until 1910; since then only as births. Data on causes of death have been collected since 1906. In France there is a special form for stillbirths but "cause of death" is not recorded. In Holland there has been compulsory registration of stillbirths since 1839 and cause of death has been recorded at least since 1911. It is noteworthy that "stillbirths" here include infants dying within the three-day period before registration. In the United States the standard certificate of birth is used for live and for stillbirths, and three questions are included pertaining to stillbirths only: (a) period of gestation, (b) cause of stillbirth, and (c) time of death in relation to labour (before or during). In England registration of stillbirths became compulsory only in 1926 when the Registration Act was revised, but no data on causes of stillbirth are secured from the medical practitioner, merely the fact of stillbirth being recorded.

Recently the Children's Bureau of the United States Department of Labor has been co-operating with the Subcommittee on Stillbirths of the American Public Health Association, in a confidential study of stillbirths. A special stillbirth certificate was devised for this purpose and in it is included a medical certificate of cause of death and supplementary questions relating to time of foetal death in relation to labour, character of labour and delivery, etc. The cause of stillbirth is solicited as a two-phase question: (a) foetal, and (b) maternal.

In Quebec since 1932, a special form has been used for foetuses, stillbirths, and deaths of infants living less than 24 hours. This form provides for a state-

CERTIFICATE OF REGISTRATION OF STILLBIRTH

Note: (1) A stillbirth is defined as a "child" born after 28 weeks or 6½ months pregnancy, in which breathing does not occur. (See instructions on reverse side)
(2) In case of more than one stillborn child at a birth, a separate return must be made for each and the number of each in order of birth indicated.

1. PLACE OF BIRTH (a) County or District..... Township..... Municipality..... (City, town or village)
(b) Street & number or name of hospital or institution.....
2. Length of stay of mother (years, months, days) in municipality of birth..... in province..... in Canada (if immigrant).....
3. Usual residence of parents (or mother) No. ..... Street..... City, town, village or township..... Province.....
4. Name of child (if named)..... (Surname) (Given name, if any) 5. Was there a physician in attendance?..... Midwife?.....
6. Sex..... 7. Single, twin, triplet, or other..... 8. Are the parents married?..... 9. Date of birth..... Month Day Year

MOTHER

10. Full maiden name.....
11. Nationality..... 12. Racial Origin.....
13. Birthplace..... (Province or Country) 14. Age last birthday.....years

OCCUPATION
15. Trade, profession or kind of work as spinner, teamster, office clerk, etc.....
16. Kind of industry or business, as cotton-mill, lumbering, bank, etc.....

17. Total number of births to this mother (including the present birth)....
(a) Born alive..... (b) Now living.....
(c) Stillborn..... (d) Births before 28 weeks gestation.....

FATHER

18. Full name.....
19. Nationality..... 20. Racial Origin.....
21. Birthplace..... (Province or Country) 22. Age last birthday.....years

OCCUPATION
23. Trade, profession or kind of work as spinner, teamster, office clerk, etc.....
24. Kind of industry or business, as cotton-mill, lumbering, bank, etc.....

25. Place of marriage of parents.....
26. Date of marriage of parents.....
27. Person giving information sign here.....
28. Address.....
29. Relationship to child.....
30. Place of burial, cremation or removal.....
31. Date of burial or removal.....
32. Undertaker..... (Name and address)

CONFIDENTIAL MEDICAL CERTIFICATE

33. Cause of Stillbirth

I
Immediate cause
Give the morbid condition which caused foetal death, not the mode of dying, as asphyxia, etc. (a).....
due to
Morbid conditions, if any, giving rise to immediate cause (stated in order proceeding backwards from immediate cause). (b).....
due to
(c).....

II
Other morbid conditions (if important) contributing to foetal death but not causally related to immediate cause. .....

34. State period of gestation at birth in completed weeks.....(weeks)
35. Was labour induced?..... Specify how.....
36. Was there manipulative, instrumental or other operative procedure for delivery?..... Was foetus dead before such procedure?.....
37. Nature of procedure.....
Low, middle or high forceps, version & extraction, Caesarean section, craniotomy, etc
38. Did death occur before labour Yes/No during labour Yes/No after labour (but before respiration Yes/No)
39. Total duration of labour.....(hours) 40. Was foetus macerated?.....
41. Specify any signs of life observed after birth.....
(Pulsation of heart, movement of voluntary muscle, etc.)
42. Was there a birth injury?..... State nature.....
43. Was there an autopsy?..... State findings.....

I hereby certify that I attended the birth of the above stillborn child and that the above statements are correct to the best of my knowledge and belief.

Signed by.....M.D.
Address..... Date.....19....

44. Division registrar's record number.....
45. Date of registration.....19.... .....
(Division Registrar)

ment of cause of death according to the time of death in relation to labour. Additional questions make provision for a clear designation of stillbirths as defined in national practice, viz., "Period of gestation" and "Any spontaneous respiration."

Suggested Form for the Registration of Stillbirths

Based on the guiding principles enunciated above and upon observations in respect to practice elsewhere, a preliminary stillbirth schedule was drawn up and submitted to discussion by the members of the Committee. Thereafter further revision was undertaken and the tentative stillbirth certificate which follows was prepared.

In preparing this draft, assistance was derived from the experience gained with a foetal death record form being used in a special study in which the School of Hygiene, University of Toronto, and the Hamilton General Hospital are co-operating. The form presented by the Committee at this time is not intended to express the full or final opinion of each of its members. Rather does it represent the sum total of constructive opinions and is offered as a basis for further discussion of the nature and scope of a stillbirth certificate which would be suitable for use throughout Canada. The Committee believes that the form submitted contains all the information which experience has indicated to be of importance.

In view of the fact that a clear statement of causal relationship is important in all death certification if an accurate picture of the true cause of death for statistical purposes is to be obtained, the Committee feels that, since this is the fundamental basis of the new standard death certificate, the statement used on it should be used also for stillbirths. Supplementary questions are included under the medical section and are limited to those which seem to be necessary in order to confirm statements given elsewhere on the certificate or to provide information which is necessary and desirable in so far as vital statistics in this field are concerned.

As pointed out above, consideration was given before drafting this schedule to the experimental form being used by the Children's Bureau of the United States Department of Labor in co-operation with the Subcommittee on Stillbirths of the American Public Health Association. The principal difference between the medical certificate on this form and the one prepared by the Committee is in respect to the statement of cause of death. As previously noted, the American form asks for two separate statements of cause of stillbirth: (a) foetal, (b) maternal. A strong objection to this type of statement lies in the fact that in many instances there may be an intimate relationship between the two statements while in others there may be none. Furthermore, this scheme makes no provision for setting down a logical sequence of causes, in order to encourage and assist the physician in indicating the underlying morbid condition responsible for death.

The following three certificates of foetal death illustrate the use of the medical certificate of cause of death on the form suggested by the Committee.

These are actual returns received at the School of Hygiene in the study of foetal deaths referred to above.

I

Immediate cause

Give the morbid condition which caused foetal death, *not* the mode of dying, as asphyxia, etc.

Morbid conditions, if any, giving rise to immediate cause (stated in order proceeding backwards from immediate cause).

II

Other morbid conditions (if important) contributing to foetal death but *not causally related to immediate cause.*

EXAMPLE 1

(a) CEREBRAL HAEMORRHAGE .....
due to
(b) DYSTOCIA .....
due to
(c) BREECH PRESENTATION .....

.....

.....

I

Immediate cause

Give the morbid condition which caused foetal death, *not* the mode of dying, as asphyxia, etc.

Morbid conditions, if any, giving rise to immediate cause (stated in order proceeding backwards from immediate cause).

II

Other morbid conditions (if important) contributing to foetal death but *not causally related to immediate cause.*

EXAMPLE 2

(a) EXCESSIVE CRANIAL STRESS (FOETAL ASPHYXIA) .....
due to
(b) DYSTOCIA .....
due to
(c) CONTRACTED PELVIS .....

RELATIVE PLACENTAL INSUFFICIENCY
INFARCTION AND DEGENERATION OF PLACENTA

I

Immediate cause

Give the morbid condition which caused foetal death, *not* the mode of dying, as asphyxia, etc.

Morbid conditions, if any, giving rise to immediate cause (stated in order proceeding backwards from immediate cause).

II

Other morbid conditions (if important) contributing to foetal death but *not causally related to immediate cause.*

EXAMPLE 3

(a) FOETAL ANAEROSIS .....
due to
(b) RELATIVE PLACENTAL INSUFFICIENCY .....
due to
(c) MATERNAL NEPHRITIC TOXAEMIA

.....

.....

In the first example the foetal death is attributable to complications of labour under the heading dystocia due to breech presentation, the second to contracted pelvis which was responsible for dystocia, and the third case obviously to the nephritic toxaemia (maternal). In the second example the physician has recorded the placental insufficiency as of importance but not causally related to the cause of death which he has noted under section I of the certificate, namely "contracted pelvis". These examples show how the medical certificate would operate in ideal practice (where autopsies are performed) and it is obvious of course that duration is not only superfluous but undesirable. It is worth noting that experience with the new form of medical statement of cause of death on the standard death certificate is tending to provide many more data on stillbirths than heretofore and in many cases the returns are remarkably scientific and complete.

The reverse side of the proposed stillbirth certificate should, the Committee feels, contain information to assist both local registrars and physicians in the collection of the desired information. A definition of stillbirth and clarification of the physician's procedure in certifying cause of death are two of the important features to which space should be given.

Believing that the complete picture in individual cases, and the physician's own opinion on the cause of death for practical purposes, can best be achieved by a logical statement of the causes in convenient order after the general scheme proposed by the special Subcommittee on Causes of Death of the League of Nations Health Committee in 1925, the Committee strongly urges that the questions relating to cause of death be similar to those now in use on the standard death certificate.

The Committee recommends further that unless there is substantial reason to the contrary, a practical clinical trial be given whatever tentative schedule is approved by the Section, so that any defects, omissions, or revisions which might later become evident, may be corrected before a form is placed in the field for national use. Whatever be the objections to delay at this time in introducing the form, they will, the Committee feels, be far outweighed by the profitable experience to be gained in such preliminary trial before the new scheme is launched in all provinces.

II. PRELIMINARY DELIBERATIONS UPON A STILLBIRTH NOSOLOGY FOR NATIONAL USE

A review of the various schemes for the classification of causes of foetal death which are now used, was made by one of the Committee and an outline of the findings and the important "lists" follows. Comments are offered under each head in order to direct attention to any features or weaknesses which are believed to exist. This question has been recently dealt with in a paper by one of the Committee* and from this some of the following remarks have been extracted as expressing the Committee's views.

*Sellers, A. H.: *The Classification of Causes of Foetal Deaths, Canad. Pub. Health J., 1937, 28: 282.*

Existing Methods of Classification

The Commission revising the International List of Causes of Death in 1929 adopted a tentative list of causes of foetal death. The rubrics in this list were grouped according to the time of death in relation to labour and length of gestation, as in table I.

TABLE I

CAUSES OF STILLBIRTH
INTERNATIONAL COMMISSION, 1929

I. *Foetal mortality during gestation*
1. Syphilis and other chronic affections.
2. Toxaemia of pregnancy (eclampsia, albuminuria, retro-placental haemorrhage, etc.).
3. Malformations incompatible with life.
4. Other and unspecified causes.

II. *Mortality due to premature expulsion*
5. Physical exhaustion of mother.
6. Traumatic condition causing premature delivery.
7. Vicious insertion.
8. Acute infections.
9. Chronic infections, as syphilis.
10. Other and unspecified causes.

III. *Foetal mortality during parturition*
11. Faulty presentation and prolapse of the cord.
12. Obstacles hindering expulsion.
13. Other and unspecified causes.

Though this classification is inadequate for detailed study, the principal defect is that the members of each section are not mutually exclusive. Though the cause of death for statistical purposes be "eclamptic toxaemia" one cannot necessarily infer the time of death in relation to labour. The Committee believes that a tabular list of causes should *not* be subdivided primarily on this basis.

In Switzerland, among the diagnoses mentioned on the form are: accidents, over-exertion, anomalies of the placenta, anomalies of the pelvis, diseases of the foetus (deformities, premature birth), malpresentations, accidents during delivery, and obstetrical operations. Table II gives the classification used in statistical reports.

TABLE II

CAUSES OF "STILLBIRTH", SWITZERLAND

1. Congenital debility.
2. Syphilis.
3. Cause unknown, state of mortification.
4. Abnormal confinement.
5. Anomalies of the placenta.
6. Anomalies of the umbilical cord.
7. Malformations in the child and anomalies in the membranes.
8. Extra-uterine pregnancy.
9. Abnormal position of the child.
10. Deformed pelvis of mother.
11. Eclampsia and puerperal albuminuria of the mother.
12. Diseases of the mother unconnected with gestation.
13. Physical or psychical traumatism of the mother.
14. Excessive strains, labour or exhaustion of the mother.
15. Stillborn, not otherwise defined, or without medical certificate.

"Congenital debility" and "abnormal confinement", however, are not clinical entities and would be better grouped with "ill-defined causes". In the opinion

of the Committee, such should be the fate of all designations which do not deserve the name "cause".

In the United States the regular annual collection of stillbirth statistics began in 1922 and data on the causes of "stillbirth" have been published at intervals since. The nosology employed is presented in table III.

TABLE III

CAUSES OF "STILLBIRTH", UNITED STATES

- General diseases
  - Syphilis
  - Other general diseases
- Extra-uterine pregnancy
- Albuminuria and other diseases incident to pregnancy
  - Albuminuria
  - Eclampsia
  - Nephritis
  - Toxaemia
  - Other diseases incident to pregnancy
- Antepartum haemorrhage
- Haemorrhage of uterus
- Inertia of uterus
- Prolapse of uterus
- Retroversion of uterus
- Rupture of uterus
- Malformations
  - Hydrocephalus
  - Spina bifida
  - Other malformations
- Diseases of the placenta and membranes
  - Placenta praevia
  - Separation of placenta
  - Diseases of the placenta
  - Premature rupture of membranes
- Abortion, miscarriage, premature birth
- Prolapse and compression of cord
  - Compression of cord
  - Cord around neck
  - Knot in cord
  - Prolapsed cord
  - Twisted cord
- Thrombosis of cord
- Malpresentation
  - Breech
  - Foot
  - Knee
  - Brow
  - Face
  - Transverse
  - Shoulder
  - Hand
  - Other and unspecified
- Difficult labour
  - Deformed pelvis
  - Instrumental delivery
  - Version
  - Other and unspecified
- Asphyxia of child (cause not stated)
- Hydramnios
- Death in utero
  - Maceration
  - Other deaths in utero
- Traumatism and overwork
- Predisposition of mother to abortion.
- Other diseases of conditions of mother
- Other specified causes
- Causes not specified and unknown

This classification, like others now used, has obviously resulted from an attempt to allocate all terms reported by physicians to some rubric in the list. It is, like the International List of Causes of Death, merely a convenient scheme for cataloguing all medical statements returned.

Eardley Holland in 1922 published his work on the causation of foetal death, based on a detailed clinical and pathological investigation of 300 foetal deaths. A simple practical classification of causes of death was adopted. As "primary cause" the gross clinical condition was selected and when such did not exist, the pathological state of the foetus or placenta was taken as cause of death. The complete outline of this classification is reproduced in table IV.

TABLE IV

CAUSES OF FOETAL DEATH, AFTER HOLLAND

Maternal States:
- Syphilis
- Probable syphilis
- Albuminuria of pregnancy

Placental States:
- Relative placental insufficiency
- Retroplacental haematoma

Eclampsia
Accidental haemorrhage
Chronic renal disease
Other maternal diseases

Complications of Labour:
Placenta praevia
Contracted pelvis
Breech presentation
Transverse presentation
Primary prolapse of cord
Coiling of cord round foetus
Prolonged labour in
Vertex presentation
Face presentation
Normal labour, excessive cranial stress
Brow presentation

Intraplacental haemorrhage
Excessive red or white infarcts
Abnormally small placenta

Foetal States:
Deformities
Postmaturity
Hydramnios
Foetal infections
Prematurity
Drug poisoning

Cause unknown (*including cases of possible syphilis*)

In 1929, Holland and Lane-Claypon contributed a further study of "dead-births" and neonatal deaths. In their report a classification of the causes of death similar to that of Holland was used with some revision and expansion. Titles included in this list are given in table V.

TABLE V

CLASSIFICATION OF FOETAL AND NEONATAL DEATHS, AFTER HOLLAND AND LANE-CLAYPON

I. *Complications of Labour*
Contracted pelvis
Transverse presentation
Breech presentation
Prolonged or difficult labour in:
Face presentation
Brow presentation
Vertex occipito post. presentation
Vertex occipito ant. presentation
Difficult forceps deliveries
Excessive size of foetus
Premature rupture of membranes
Precipitate labour
Prolapse of cord
Coiling of cord round foetus
Dystocia of indefinite cause
Normal labour:
With excessive cranial stress
With asphyxia
Others

II. *Ante-partum Haemorrhage*
Placenta praevia
Accidental haemorrhage

III. *Toxaemia of Pregnancy*
Eclampsia
Albuminuria of pregnancy

IV. *Syphilis*
Certain (i.e., spirochaetes found)
Probable
Possible

V. *Maternal Diseases*
Chronic renal
Cardiac
Tuberculosis
Pneumonia, bronchitis, empyema
Intestinal obstruction
Epilepsy
Others

VI. *Placental States*
Excessive red or white infarction
Retroplacental haematoma
Other placental degenerations
Excessively small placenta

VII. *Foetal States* (*excluding syphilis*)
Hydrocephalus
Anencephaly
Spina bifida
General oedema of the foetus
Other deformities
Multiple pregnancy
Hydramnios
Others

VIII. *Prematurity*

IX. *Cause Unknown*

X. *Deaths due to Post-natal Causes*

XI. *Insufficient Information*

XII. *Non-viable Cases*

The Committee agree that this nosology is of great merit from the clinical point of view. Specific provision is made only for primary causes, the rubric "prematurity" being restricted to cases for which data on the cause of the prematurity was not available. The defects in the schedule are chiefly two. It does not provide adequately in its present form for maternal diseases and it makes no provision for recording consequent factors or complications, which would be necessary and desirable, especially in detailed studies.

In 1929 Campbell and McKinlay published a report embodying the English contribution to the international inquiry organized by the Health Section of the League of Nations in 1927, and concerning specifically the causes and prevention of stillbirths, as well as mortality during the first year of life. These workers used a list of causes of death differing only in minor detail from the outline suggested by the International Commission in 1929, the three main groups of causes being (a) deaths of the foetus during pregnancy; (b) deaths due to premature birth; and (c) deaths of the foetus during labour. Table VI gives the tabular list used by these workers.

TABLE VI

CLASSIFICATION OF "STILLBIRTHS", AFTER CAMPBELL AND MCKINLAY (1929)

Death of the foetus during pregnancy:

Syphilis and other chronic diseases.
Toxaemias of pregnancy (eclampsia, albuminuria, retro-placental haemorrhage, etc.).
Malformations incompatible with life.
Occupational poisonings.
Unknown causes.

Death due to premature birth (debility incompatible with extra-uterine survival):

Infants otherwise healthy	Overwork of the mother. Violent traumatism inducing premature labor. Malpresentation.
Infants otherwise healthy or defective	Acute infections. Chronic infections, particularly syphilis. Maternal or foetal diseases (diseases of the heart, pernicious anaemia, etc.; for example, such conditions may terminate pregnancy spontaneously or necessitate the artificial emptying of the uterus.

Death of the foetus during labour (Death due to mechanical causes):

Malpresentations	Shoulder. Breech. Face.
Obstacles to the birth of the infant	Contracted pelvis. Tumour obstructing birth-canal. Anomalies in the dilatation of the birth-canal. Mal-position of the placenta.
Miscellaneous*	Protrusion of the cord. Abnormal uterine contractions. Infections of the foetus.
Other exceptional causes	Excessive size of the foetus. Dystocia due to presence of twins. Monstrosity capable of more or less prolonged survival, but causing dystocia (hydrocephalus, for instance).

Unknown causes.

**These are almost always secondary causes, associated with one of the causes mentioned in preceding titles, but they may be of first importance.*

This list has all the defects of the outline suggested by the International Commission. The arrangement of titles, unlike that of Holland and Lane-Claypon, is not entirely logical or convenient.

The Children's Bureau of the United States Department of Labor in co-operation with the Subcommittee on Stillbirths of the American Public Health Association has drafted a list of causes of stillbirth for use in the confidential clinical study which is being undertaken jointly by them. This list is divided into two sections: (a) causes determined in the foetus; and (b) causes and conditions in the mother, associated with the foetal death. The two classifications are quite distinct, but they are both modelled as far as possible in conformity with the International List and new titles created only where no existing one is adequate. The complete schedule of the scheme is given in table VII.

TABLE VII

CAUSES OF STILLBIRTH

EMPLOYED BY THE CHILDREN'S BUREAU OF THE UNITED STATES DEPARTMENT OF LABOR, 1935

A. *Causes determined in the foetus*

1. Infection
   (a) Syphilis
   (b) Sepsis
   (c) Other infections
2. Asphyxia
   (a) Separation of placenta
   (b) Abnormalities of cord
   (c) Other causes of asphyxia
3. Congenital malformations
   (a) Hydrocephalus
   (b) Anencephalus
   (c) Spina bifida and meningocele
   (d) Malformations of heart
   (e) Other
4. Birth injury
   (a) Malpresentations
   (b) Difficult labor
   (c) Other causes of physical injury of foetus
5. Other diseases or conditions affecting the foetus primarily.
6. Cause unknown.

B. *Causes and conditions in the mother associated with the foetal death.*

1. Infectious and parasitic diseases
   (a) Influenza
   (b) Tuberculosis
   (c) Syphilis
   (d) Other
2. Cancers and other tumors
   (a) Malignant and other tumors of the female genital organs
   (b) Malignant and other tumors of other organs.
3. Rheumatic, nutritional, endocrine, and other general diseases
   (a) Acute rheumatic fever
   (b) Diabetes
   (c) Diseases of the thyroid and parathyroid glands
   (d) Other
4. Diseases of the blood and blood-making organs
   (a) Pernicious anaemia
   (b) Other
5. Chronic poisonings and intoxications
   (a) Alcoholism
   (b) Lead poisonings
   (c) Other
6. Diseases of the nervous system and organs of special sense
   (a) Psychosis
   (b) Epilepsy
   (c) Other
7. Diseases of the circulatory system
   (a) Diseases of heart
   (b) Diseases of arteries
8. Diseases of the respiratory system
   (a) Bronchitis
   (b) Pneumonia
   (c) Other
9. Diseases of the digestive system
   (a) Diseases of liver (specify)
   (b) Appendicitis
   (c) Hernia, intestinal obstruction
   (d) Other
10. Diseases of the genito-urinary system (known to have preceded pregnancy)
    (a) Nephritis
    (b) Other
11. Diseases of pregnancy and childbirth
    (a) Sepsis-observed before delivery
    (b) Albuminuria, eclampsia, and pyelitis
    (c) Other toxaemias (specify with or without convulsions)
    (d) Haemorrhages, ante and intra-partum, due to placental abnormalities and other conditions
    (e) Ectopic gestation
    (f) Other accidents of pregnancy and childbirth (specify)
12. Operations other than for delivery (specify)
13. Conditions of the bones interfering with normal labor
14. External causes
    (a) Traumatism—blow, fall, shock, etc.
    (b) Overwork
    (c) Other (specify)
15. Other diseases and conditions of the mother (specify)
16. Cause unknown.

There are, in the opinion of the Committee, many objections to such a scheme. Since general practice in vital statistics permits the publishing of only one "cause" for each death except in special studies, provision must be made for the physician to indicate which of two or more separate entities is in his opinion "primary". Failure to do so must invalidate the data or make necessary arbitrary rules of selection which are most undesirable. There is also considerable overlapping in such a scheme. A foetus can not be syphilitic unless its mother is, yet two rubrics are provided for syphilis. A foetus may die of asphyxia following placenta praevia and yet there might be several consequent factors besides the asphyxia, viz., prolapsed cord, foetal cranial injury, etc. Regardless of the number of consequent or complicating conditions in such a case, the death of the foetus should be ascribed to the placenta praevia. Finally, the list contains a mixture of primary causes, complicating conditions and terminal events, which though not in itself a defect, since it provides for recording such data for the purposes of analysis, is undesirable unless such terms are clearly separated in the tabular list from true primary factors.

DISCUSSION

Recently one of the Committee published a paper dealing with the classification of causes of stillbirths. Herein appeared an outline of the actual scheme used in a study of foetal deaths in Ontario Public Hospitals reported upon earlier. This scheme was based upon a clinical and pathological foundation and could perhaps best be regarded as an ideal tabular list. This, however, the Committee feels is no objection to its general use despite the fact that in many instances the data needed may not be returned on the forms, indeed may not be known due to lack of autopsy information. A good clinical statement on the certificate of cause of death included in section I above will, however, provide useful information in a great many cases.

The Committee reaffirms the opinion expressed in the Third Report of the Committee on Certification of Causes of Death, namely, that whatever nomenclature of causes of stillbirth is adopted, the tabular list "need not be bound by present rubrics in the International List." It further is of the opinion that whatever list of causes is adopted for national use should be drawn up and agreed upon *before a proposed standard stillbirth form is introduced* and that an effort should be made to educate physicians to give scientific returns from the outset so that rules of choice for the selection of a cause of death will not, except in perhaps a few instances, be necessary. Further, whatever list is adopted should be logical in plan, based on clinical and practical needs and reflect existing scientific knowledge and opinion in so far as is now possible.

H. A. ANSLEY, EUGENE GAGNON, A. P. PAGET, PAUL PARROT, and A. H. SELLERS, *Chairman*.

REPORT OF THE COMMITTEE ON RESOLUTIONS

THE Committee on Resolutions, comprising Dr. R. O. Davison, Dr. N. MacL. Harris, Dr. P. Creelman, and Dr. J. T. Phair, presented the following resolutions which were adopted by the Executive Council and approved by the annual meeting in Ottawa June 19, 1937:

BE IT RESOLVED:

1. THAT THE THANKS of the Association be extended to the members of the Local Committee on Arrangements for their untiring efforts in insuring the success of this meeting.

2. THAT THE THANKS of the Association be extended to the Press of Ottawa for the generous allotment of space given to the papers and deliberations of this conference.

3. THAT THE ASSOCIATION extend to the Management of the Chateau Laurier their sincere appreciation of the excellent service provided for the members during the convention.

4. THAT THE THANKS of the Association be extended to the Corporation of the City of Ottawa for its kindness in entertaining the members of the Association at luncheon at the Water Filtration Plant.

5. THAT THE APPRECIATION of the Association for the generous hospitality extended be forwarded to Senator Cairine Wilson and Colonel Edwards.

6. THAT THE FELICITATIONS of the Canadian Public Health Association in Convention be extended by a representative of the Association to the American Public Health Association at the time of its annual meeting in October.

7. THAT THE ASSOCIATION notes with deep regret the deaths of several of its members during the past year and requests that the secretary be instructed to convey to the members of their families the sympathy of the Association in their bereavement.

8. THAT THE SYMPATHY of the Association be expressed to Dr. Grant Fleming on the recent death of his father.

9. THAT THE ASSOCIATION express its heartfelt thanks to Dr. Charles P. Fenwick for the services so willingly rendered in his capacity as Treasurer during the past nine years; and that the Secretary be instructed to inform Dr. Fenwick of the deep regret with which his resignation is accepted.

10. THAT THE APPRECIATION of the Association be forwarded to the American Public Health Association for its generous action in making possible the arrangements for the conduct of rural health conservation contests in Canada.

11. THAT THE ASSOCIATION express its appreciation of the action of the Dominion Government in strengthening the Department of National Health by providing for the appointment of additional scientific personnel; the restoration of the divisions of Publicity and Health Education, and Maternal and Child Welfare; the creation of two new divisions, one in Epidemiology and one in Industrial Hygiene; and the appointment of two additional experienced workers in the Laboratory of Hygiene; and, further, that the Association convey to the Honourable Mr. C. G. Power, Minister of Pensions and National Health, its hearty endorsation of the plans which he has made for the enlargement of the Department.

RESOLUTIONS FROM THE SECTIONS

Section of Social Hygiene

THAT WHEREAS THE venereal-disease problem is a matter of national importance, previously dealt with most efficiently in Canada by a carefully co-ordinated scheme involving co-operation between the Dominion and the Provinces, financial and otherwise, and carried on by virtue of the existence of a Venereal Disease Division in the Dominion Department of Health, assistance to organized education and propaganda;

AND WHEREAS three conferences of clinicians called by the Dominion Government in Edmonton, Toronto and Montreal in 1931 made various recommendations, practically none of which have been carried out;

AND WHEREAS the Dominion Council of Health in December, 1931, endorsed these recommendations urging continuance of grants and extension of the scheme,

THEREFORE BE IT RESOLVED THAT the Dominion Government be memorialized and asked to reinstate the grants to the Provinces, to re-establish the Division of Venereal Diseases in the Dominion Government, and to make adequate provision for educational purposes throughout Canada to the end that the Canadian scheme be once more put on an effective basis.

Section of Public Health Nursing

WHEREAS present studies made by a special committee of the Public Health Nursing Section have indicated in general the absence of uniformity in respect to standards for employment of public health nurses;

AND WHEREAS the elaboration and approval by this Section of a set of minimum standards is not only desirable but a necessary adjunct toward achieving definite improvement in such nursing personnel secured over the next few years;

AND WHEREAS further elaboration of such standards would serve to facilitate and encourage other desirable developments in the public health nursing field;

BE IT RESOLVED THAT the Public Health Nursing Section record its belief that the present lack of uniformity in respect to requirements for employment of public health nurses is unsatisfactory;

BE IT RESOLVED FURTHER THAT this Section appoint a representative committee to draft at an early date a schedule of minimum requirements for employment of public health nurses.

Section of Vital Statistics and Epidemiology

WHEREAS in the opinion of this Section the value of vital statistics would be greatly enhanced if births and deaths were compiled on the basis of residence as well as by place of occurrence,

AND WHEREAS the Dominion Bureau of Statistics has established reallocation by residence as a routine measure and the available standards of procedure in connection therewith have been adopted by this Section,

AND WHEREAS a statement setting forth the work and recommendations of the committee has been forwarded to the nine provincial bureaux and in reply to a questionnaire they have expressed their willingness to co-operate in the scheme set forth in the statement,

AND WHEREAS the Section of Vital Statistics and Epidemiology concurs in the procedure recommended and which is being carried out in at least three provinces at the present time,

THEREFORE BE IT RESOLVED THAT the Dominion Bureau of Statistics be requested to prepare a suitable memorandum respecting the reallocation of births and deaths by residence and forward a copy of the same to each province,

AND BE IT RESOLVED FURTHER THAT a copy of this resolution be forwarded to each province, together with the request to proceed as early as possible in supplying copies of certificates of births and deaths to the province in which the deceased person, or the mother in case of birth, had fixed residence or usual place of abode, and that every effort be made to supply municipalities who desire it, either by copies of certificates or in some other satisfactory manner, the information essential to the compilation of their vital statistics on the basis of residence.

REPORT OF THE COMMITTEE ON NOMINATIONS

THE following report of the Nominating Committee, comprising Dr. F. W. Jackson, Dr. J. J. Heagerty, and Dr. Wm. Warwick, was adopted by the Executive Council and approved by the annual meeting in Ottawa June 19, 1937.

OFFICERS FOR 1938

Nominations.

Honorary President: The Hon. F. R. Davis, M.D., Minister of Health, Province of Nova Scotia, Halifax; *President:* Dr. P. S. Campbell, Chief Health Officer, Province of Nova Scotia, Halifax; *First Vice-president:* Dr. R. E. Wodehouse, Deputy Minister of Pensions and National Health, Ottawa; *Second Vice-president:* Dr. Emile Nadeau, Acting Director, Ministery of Health, Province of Quebec, Quebec; *Third Vice-president:* Dr. R. O. Davison, Deputy Minister of Public Health, Province of Saskatchewan, Regina; *Honorary Secretary:* Dr. J. T. Phair, Chief Medical Officer of Health for Ontario, Toronto; *Honorary Treasurer:* Dr. A. L. McKay, Director, Division of Preventable Diseases, Department of Health of Ontario, Toronto; *Associate Secretary:* Dr. A. H. Sellers, Medical Statistician, Department of Health of Ontario, Toronto; *Chairman, Editorial Board:* Dr. R. D. Defries, School of Hygiene University of Toronto.

Executive Committee: Dr. Gordon Bates, Toronto; Dr. Chester P. Brown, Ottawa; Dr. P. S. Campbell, Halifax; Dr. R. D. Defries, Toronto; Dr. H. G. Grant, Hal fax; Dr. A. L. McKay, Toronto; Dr. J. T. Phair, Toronto; and Dr. George D. Porter, Toronito.

SECTION OFFICERS

Industrial Hygiene: Chairman, Dr. R. B. Robson, Windsor; Vice-chairman, to be appointed; Secretary, Dr. H. M. Barrett, Toronto.

Laboratory: To be elected at the Christmas meeting of the Section.

Mental Hygiene: Chairman, Dr. Murray MacKay, Halifax, N.S.; Secretary, Dr. G. S. Chalk, Toronto.

Public Health Education: Chairman, Dr. G. F. Amyot, Vancouver; Vice-chairman, Miss Mary Power, Toronto; Secretary, Dr. Stewart Murray, Vancouver.

Public Health Engineering: Chairman, Mr. N. J. Howard, Toronto; Vice-chairman, to be appointed; Trustees, Mr. Aime Cousineau, Montreal, and Mr. F. M. Brickenden, Winnipeg; Secretary, Mr. E. W. Johnston, Toronto.

Public Health Nursing: Chairman, Miss Edna L. Moore, Reg. N., Toronto; Vice-chairman, to be appointed; Secretary, Miss Gordon Lovell, Toronto.

Vital Statistics and Epidemiology: Chairman, Dr. Mary A. Ross, Toronto; First Vice-chairman, Dr. L. A. Pequegnat, Toronto; Second Vice-chairman, Dr. J. Wyllie, Kingston; Secretary, Mr. W. R. Tracey, Ottawa; Section Council: Dr. Eugene Gagnon, Montreal; Mr. T. E. Ashton, Toronto; and Mr. E. S. Macphail, Ottawa.

CURRENT PUBLIC HEALTH COMMENT

CANCER AND RADIUM TREATMENT IN GREAT BRITAIN

A GROWING body of clinical and statistical evidence has established radium as a sound and effective weapon in the treatment of cancer. The seventh annual report of the National Radium Trust and the Radium Commission (now in its eighth year) covering the year ending March 31, 1936, has much to offer in this connection and adds still further to our knowledge of the efficacy of radium in cancer treatment. The content of this document is particularly important to Canadians in view of developments in cancer control in Canada, cancer clinics now having been established for several years in Saskatchewan and in Ontario.

There are now thirteen National Radium Commission centres for the treatment of cancer by radio-therapy. In addition there are five so-called regional centres and four "recognized" hospitals. The activity and new developments in each of these is discussed in the earlier part of the report, in which part one also finds information upon one-gram unit therapy. This form of treatment, so-called telradium therapy, has obtained an established place in the treatment of selected cancer cases. It is pointed out that there is a tendency toward the greater use of surface applications by large units, which tendency indicates the need for the provision of more radium.

A summary of the number of patients treated in these centres shows a steady increase in the number of cases receiving radium therapy—from 3,258 in 1930 to 7,402 in 1934. Computations show that of about 40,000 patients estimated to be suffering from cancer of those accessible organs in which radiation treatment may be of value, about 8,000 actually obtain this form of treatment. (In Ontario, approximately half of an estimated number of 2,400 cases of cancer of accessible sites were treated during 1936 at the Government clinics.)

It is pointed out by the Chairman, Lord Donoughmore, that extension of existing centres to meet the national need for radio-therapy requires a further supply of radium (the amount now in use exceeds 40 grams). Emphasis is laid upon the danger otherwise of independent use of radium in circumstances which the Commission could not view with satisfaction.

Statistical Report on the Results of Radio-therapy

Of special interest in this report are the statistical data presented on the results obtained in cancer of those sites particularly amenable to radium treatment (breast, cervix uteri, lip, tongue, and floor of mouth) at hospitals associated with the Commission. This report occupies fifty pages and well deserves the careful study of all those interested in the cancer problem.

The material for this report was collected from a large number of hospitals in all parts of the country and the data are based on an analysis of the records of over 5,600 patients admitted for treatment from January 1, 1930 to December 31, 1932. Complete details concerning the basis of study of the cases included are given. Excluded from analysis are recurrent cases (patients treated previously and considered free from active disease, who are then admitted with an active lesion). Also excluded are the patients who refused treatment and the cases in which the clinical diagnosis disagreed with the histological diagnosis, as well as those in which the stage of disease was not noted.

The net survival rates which are presented reveal the average experience of the country in radium treatment, in combination with other methods, upon the average patient seeking treatment. For the purpose of calculation the net survival rate is defined as the proportion of patients who are alive, irrespective of the presence or absence of active disease, to the total number of patients treated, including

those who have died of operation, but excluding the total number of patients dead from other causes than cancer, and patients lost sight of. It is pointed out that all the results tend to understate the beneficial results of radium treatment since whenever any question of procedure arose care was taken to adopt that method which would understate rather than overstate the survival rate.

It should be noted that all patients accepted for radium treatment have been included regardless of whether the treatment was intended to be curative or palliative. There has been no selection of records. A striking indication of the excellent co-operation of the hospital staff in the follow-up of patients treated and in the accuracy of the material is demonstrated in the small proportion of patients lost sight of—only 3.9 per cent. of the total.

Since radium treatment is an established method of treatment, particularly in cancer of the accessible sites, it is therefore no longer a question of whether radium *is* of any value; rather is the problem now one of assessing *the extent of its value* under different circumstances.

To provide the answers to the many questions regarding radium treatment which were needed by the medical profession and for the public education, the Commission laid elaborate plans for securing records, in a uniform fashion, of all cases treated at the National and Regional Centres and other hospitals "recognized" or co-operating with the Commission. To this end, a series of special follow-up cards was devised, and the data recorded on these cards, which were returned to the Commission once a year, provided the information upon which the present report and survival rates are based.

The statistical data are grouped in separate sections by site, the same plan being followed in each. The following are the subjects treated for each site, statistical tables being presented for each: percentage net survival rates by stage of disease, patients who have died by cause of death, percentage three-year net survival rates according to whether or not a histological examination was made, main methods of treatment and patients treated, percentage net survival and symptom-free rate at three and five years after treatment according to method of treatment and stage of disease, age distribution of patients, and three-year survival rates according to age of patients and stage of disease.

Some Highlights of the Statistical Findings

A review of the data on carcinoma of the breast for three years shows a decline in the use of interstitial radium and an increase in the use of surface applications. The three-year survival rates of those treated by interstitial radium alone and interstitial radium plus excision do not show a significant difference, though there is a suggestion favouring the latter. Similarly, the differences in survival rates of patients under 50 years of age and 50 years and over do not show significant differences.

The statistics for carcinoma of the cervix indicate that after three years have elapsed the number of patients who die of cancer is very small and that these are chiefly patients who have never been symptom-free. Half of the patients in stage I were alive at the end of five years. The rates of survival are found to be higher for patients on whom a histological examination was done. This may, perhaps, be due to the fact that the treatment was better in these cases. At any rate, this finding makes it clear that the group on which no pathological diagnosis was available is not vitiated by the inclusion of non-malignant conditions. Among patients treated for carcinoma of the cervix, as for breast, there is evidence of a marked decline in the use of interstitial radium treatment. It is interesting that hysterectomy was rather infrequent in these cases, being undertaken in only 1.7 per cent. of over 2,000 cases. The survival rates appear to be higher at age 50 and over and confirm the better chances of patients at older ages. It is noteworthy that the proportion

of patients in the early stages of disease is greater among patients under 50 years of age than among those over 50, showing that the young group seek treatment earlier than the old.

In carcinoma of the lip, the survival rates indicate strikingly the great importance of involvement of the glands, the three-year survival rate being 77.5 per cent. when the growth was limited to the lip and only 44.5 per cent. when the regional glands were invaded. The survival rates for cases of carcinoma of the tongue (1,240) also emphasize the risk to life represented by extension of the growth to other structures of the body. The three-year survival rate was found to be 49.7 per cent. when the growth was limited to the tongue and 12.6 per cent. when the glands were involved.

The patients under review have, of course, not been treated by radium only. Indeed, it was found that there were 86 different combinations of treatment in carcinoma of the breast, 66 in carcinoma of the cervix and 110 in carcinoma of the tongue. This situation arises in the fact that though there are three main methods of radium therapy, each of these may be combined with varied surgical and x-ray treatments.

A summary table of the net survival rates is given in the concluding section of the report, as follows:

Site	Earliest Stage of Disease		All Stages of Disease	
	3 years	5 years	3 years	5 years
Breast	70.1	50.0	37.2	24.6
Cervix uteri	61.1	49.4	37.3	31.1
Lip	77.5	77.8*	63.8	53.6
Tongue	49.7	26.2	25.7	13.9
Floor of mouth	62.0	53.6	36.2	31.0

*Small group of patients.

From a clinical standpoint, however, the detailed tables given elsewhere in the text are the ones of special note, only a general picture being obtainable from the above data.

Comment

Perhaps the chief present difficulty in cancer treatment is the late stage of disease at which a great proportion of the patients seek treatment. This is emphasized by the following statement in the report: "The proportion of patients in whom the disease is still localized and in whom there are no signs of local or metastatic spread when the patient is first seen, amounts for all sites investigated to only 25 per cent. of patients. The marked difference in the survival rates shows that for these patients the chances of survival are much more favourable than when either local spread or metastasis has taken place." The report is reassuring, however, in that there apparently is a tendency for the proportion of patients coming for radium treatment at an early stage to increase, particularly for certain sites.

This report is a valuable document. It marks a further stage in man's effort to control cancer. As a record of the nature of success which may presently be expected (on the average) under various circumstances, it will serve to direct the efforts of the medical profession and official bodies interested in cancer control along certain lines. Especially has it possibilities in respect to public education, for much of the data suggests that substantial improvement in the present situation in the control of cancer of accessible sites depends on getting the patients to the treatment centres at an early stage.

Considerable inspiration will be obtained from this report by all Canadian workers who read it. On August 12th a new scheme of uniform recording was introduced in all cancer clinics in Ontario, a scheme which will yield such valuable data for Ontario as have been presented for England in the seventh annual report of the National Radium Trust and Radium Commission. The success of the English scheme, the energetic work of the follow-up departments of the hospitals concerned, and the accuracy of the whole material should also be a challenge to the directors of all Canadian cancer centres. All who participated in making possible this English statistical report on cancer treatment and follow-up are to be warmly congratulated by us in Canada.—*A. Hardisty Sellers, B.A., M.D., D.P.H.*

ASSOCIATION NEWS

PRELIMINARY PROGRAM

SIXTH ANNUAL CHRISTMAS MEETING

LABORATORY SECTION

TORONTO, DECEMBER 20-22, 1937

Headquarters: Royal York Hotel

MONDAY, DECEMBER 20th

Opening Session, 2.15 p.m.—PRIVATE DINING ROOM NO. 9, MAIN MEZZANINE FLOOR.

Registration. (A fee of 50 cents is being charged to cover in part the cost of the meeting.)

1. Observations on the Action of Haemolytic Staphylococci upon Sheep Erythrocytes—Dr. C. E. Dolman, Connaught Laboratories (Western Division), University of Toronto, and the Department of Bacteriology and Preventive Medicine, The University of British Columbia, Vancouver.
2. Ankylostomiasis in a Chinese Patient—Dr. W. B. McClure and Dr. W. E. L. Sparks, Division of Laboratories, Department of Health of Ontario, Toronto.
3. The Haemolysis of Human Erythrocytes by Staphylococcus Toxin—Dr. T. E. Roy, Department of Bacteriology, McGill University, Montreal.
4. A Study of Micrococci surviving Freezing Temperatures in Frozen-Pack Vegetables—A. H. Jones, Department of Agriculture, Ottawa.
5. A Case of Paratyphoid A Infection—Dr. C. Ross Ferguson and Dr. A. L. MacNabb, Division of Laboratories, Department of Health of Ontario, Toronto.
6. Two Cases of Cadmium Poisoning—Dr. W. L. Robinson, Professor of Pathology and Associate Director of Applied Pathology, University of Toronto.
7. B. Coli in Pasteurized Milk—Dr. Ambrose Moffat and J. Mackay, Division of Laboratories, Department of Public Health, City of Toronto.
8. Lipids of Leucocytes in Relation to Prognosis and Immunity—Dr. Eldon M. Boyd, Queen's University, Kingston, Ont.
9. Experiments with Staphylococcus Enterotoxin—Dr. C. E. Dolman and Mr. R. J. Wilson, Connaught Laboratories (Western Division), University of Toronto, and the Department of Bacteriology and Preventive Medicine, The University of British Columbia, Vancouver.
10. Isolation of Virus from Cases of Influenza in Toronto—Dr. Ronald Hare, Connaught Laboratories, University of Toronto, and Dr. C. H. Yen, Peiping Union Medical College, Peiping, China.
11. A Rapid Test for Syphilis—Dr. G. Laughlen, Pathologist, Toronto East General Hospital and St. Joseph's Hospital, Toronto.
12. The Types of Pneumococci Isolated from Children—Dr. M. H. Brown and Miss E. A. Anderson, Connaught Laboratories, University of Toronto.

Dinner and Evening Session, 6.45 p.m.—ENGINEERS CLUB, 350 Bay Street. Tickets $1.00.

Chairman—Professor E. G. D. Murray, Department of Bacteriology, McGill University, Montreal.

Committee Reports.

Round-table discussion: THE LABORATORY DIAGNOSIS OF ENTERIC INFECTIONS.

Subject to be introduced by Dr. A. J. Slack, Director, Institute of Public Health, London; Dr. A. L. MacNabb, Director of Laboratories, Department of Health of Ontario, Toronto; and Dr. M. H. Brown, Connaught Laboratories and School of Hygiene, University of Toronto.

TUESDAY, DECEMBER 21st

Morning Session, 9.15 a.m.—PRIVATE DINING ROOM NO. 9, MAIN MEZZANINE FLOOR.

1. Serological Differences between Strains of Human Influenza Virus—Dr. Ronald Hare, Connaught Laboratories and School of Hygiene, University of Toronto.
2. A Water-born Epidemic of Typhoid Fever—Dr. A. R. Foley, Epidemiologist, Ministry of Health of Quebec, Quebec.

3. A New Concept in the Study of Fat Deterioration—C. Castell, Department of Bacteriology, Ontario Agricultural College, Guelph, Ont.
4. Comparative Results of Wassermann and Kahn Reactions in 108,000 Tests—Dr. E. P. Johns, Faculty of Public Health, University of Western Ontario, London.
5. A Comparison of Several Methods of Determining Small Amounts of Cyanides in Water—J. E. Fasken, B.A.Sc., Chemist, Division of Laboratories, Department of Health of Ontario, Toronto.
6. The Relation between Allergy and Resistance in Guinea-pigs vaccinated with BCG (Bacillus-Calmette-Guerin)—Dr. Armand Frappier and Victorien Fredette, B.Ph., M.Sc., *Service du BCG*, University of Montreal, Montreal.
7. Observations on V Bacteriophage—Dr. J. Craigie, Connaught Laboratories and School of Hygiene, University of Toronto, and Dr. C. H. Yen, Peiping Union Medical College, Peiping, China.
8. Effects of Vaccine-Therapy on the Chemical Composition of Milk from Cows with Mastitis—Edouard Brochu, L.Sc.A., Professor of Bacteriology, Oka Agricultural College, La Trappe, Que.
9. Studies in Whooping Cough—Dr. Nelles Silverthorne, Connaught Laboratories, University of Toronto.
10. Streptococcal and Staphylococcal Synergism in Culture and in Infection—Dr. Philip H. Greey, Department of Pathology and Bacteriology, University of Toronto.
11. The Relationship of Pathology to Public Health—Dr. H. A. Ansley, Division of Laboratories, Department of Health of Ontario, Toronto.
12. Changes in Staphylococcus Antitoxin in Experimental Infection—Dr. J. S. Kitching and Dr. L. N. Farrell, Connaught Laboratories and School of Hygiene, University of Toronto.

Luncheon Session, 1 p.m.—TUDOR ROOM. Tickets $1.00.

Speaker—Dr. William Boyd, Professor of Pathology and Bacteriology, University of Toronto.

Report of the Committee on Nominations and Resolutions.

Afternoon Session, 2.15 p.m.—PRIVATE DINING ROOM NO. 9, MAIN MEZZANINE FLOOR.

1. Studies in Diphtheria—Dr. D. T. Fraser, Miss K. Halpern, and Miss I. S. Roy, Connaught Laboratories, University of Toronto.
2. The Value of Serological Studies in Epidemic Influenza—Dr. Thomas Francis, Jr., Laboratories of the Rockefeller Foundation, New York.
3. Preliminary Studies of Distemper Virus on the Chorio-Allantoic Membrane of the Developing Egg—Dr. P. J. G. Plummer, Animal Diseases Research Institute, Hull, Quebec.
4. Characters of *Shigella sonnei*—Dr. J. H. Glynn, Department of Bacteriology, McGill University, and Dr. D. H. Starkey, Department of Bacteriology, Royal Victoria Hospital and McGill University, Montreal.
5. An Account of the Detection of Two Typhoid Carriers—Dr. J. Wyllie, Professor of Preventive Medicine, Queen's University, Kingston.
6. A Study of Seradiagnostic Methods for Syphilis—Dr. A. L. MacNabb and Miss Gladys Matthews, Division of Laboratories, Department of Health of Ontario, Toronto.
7. Brucellosis in and around Vancouver—Miss Vivienne Hudson and Dr. C. E. Dolman, Division of Laboratories, Provincial Board of Health, Vancouver, B. C.

EXHIBITS

The Committee in charge of arrangements desires to direct attention to the exhibits of the Central Scientific Company of Canada Limited and Difco Laboratories, Inc.

WEDNESDAY, DECEMBER 22nd—DEMONSTRATIONS

Following the suggestion made to the committee that more time be allowed for the presentation of demonstrations, it has been decided to arrange a series of demonstrations on Wednesday morning. The presentation of these in the Connaught Laboratories and School of Hygiene, University of Toronto, and the laboratories of the Department of Health of Ontario, will make possible more satisfactory demonstrations. This is illustrated, for instance, in the demonstration in the Department of Health laboratories of the Electric Scopometer for the determination of the total protein content of spinal fluids, the apparatus being of such a nature that it could not readily be transported to the meeting.

It is believed that this new provision will meet with the approval of the members and that many will plan to extend their stay in Toronto for the purpose of attending the demonstrations. Details will be presented in the final program.

BOOKS AND REPORTS

Handbook of Health Education. *A Guide for Teachers in Rural Schools. Edited by Ruth E. Grout, Director of Health Education Study, Cattaraugus County, New York. Doubleday, Doran and Company, Inc., Garden City, N.Y., 1937. 298 pages. $1.80.*

THAT education in health should be a basic part of the child's preparation for life is recognized by all associated with public health work and to an increasing extent by those who are responsible for the planning of school instruction, particularly in elementary schools. There is much to be learned concerning the content of this health teaching.

The contribution that the Milbank Memorial Fund made in Cattaraugus County in demonstrating the value of adequate health services has been far-reaching in its effect. Like the other publications which have made available the findings of the demonstration, this volume will be heartily welcomed. It presents the methods developed by teachers in the County in connection with the school education project and embodies the experience and ideas of the hundred or more teachers who participated in the effort.

There are two central themes: health as presented in a study of growth and health as presented in a study of the healthy individual in a healthful community. To prevent monotony in the presentation of the same health ideas yearly, these two themes were offered in alternate years. The material is highly suggestive and details are given of how the various aspects have been successfully presented.

From the experience of the four-year experiment on which the findings are based, the plan assures that the child understands the reasons for good health behaviour and has helped in carrying out the development of health habits, and the school program is identified with the programs of the home and the community.

The Milbank Foundation has again generously assisted in making this volume widely available by arranging for its sale at the reduced price of $1.80. The material is excellently presented with many helpful illustrations.

R. D. Defries

Some Fundamental Aspects of the Cancer Problem. *Edited by Henry Baldwin Ward. Publication no. 4 of the American Association for the Advancement of Science, June, 1937. Supplement to "Science", volume 85. Cloth bound $2.50, paper bound $2.00. 248 pages.*

IN THE words of the editor, Henry B. Ward, "the papers printed herein give abundant evidence that the field of cancer research is so broad and diversified that at the present state of knowledge differences of opinion concerning the merit of individual conclusions are sure to arise." Papers on five aspects of the cancer problem are included in this book: Hereditary and Constitutional Factors; Induction, Stimulation and Inhibition of Tumorous Growths; Metabolism of Cancerous Tissue; Radiation; and General Discussions on the Cancer Problem. These papers were presented at a symposium on cancer sponsored by the Section of Medical Sciences of the American Association for the Advancement of Science.

To those who are specially interested in some of these technical fields this printed record will be of definite interest. The concise discussion of cancer statistics and the part they may play in cancer control, and the statement regarding the social significance of cancer, are both of general application. The latter paper sets forth various ways in which organized effort may be of definite value in furthering the attack on cancer.

A. Hardisty Sellers

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- Active membership is limited to those professionally engaged in public health work in Canada.
- Associate membership is open to others in Canada and elsewhere who are interested in public health and preventive medicine.
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- The membership year is January 1st to December 31st. Those making application during the first six months of the year will be entered from the first of the year and will be sent copies of the Journal from January. Those applying after June 30th will be billed for the six months July to December of the current year and for the following year. They will receive copies of the Journal from July.
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CANADIAN PUBLIC HEALTH ASSOCIATION
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Abuse?--Misuse?--Disuse?

A FOOT sometimes seems to break down all at once. The pain may be sudden but the breakdown almost always is gradual. Foot troubles, like ailments in other parts of the body, can usually be traced back to their sources.

If you have pain in your foot, you need the advice of your doctor or an orthopedist, who specializes in preventing and correcting foot and other deformities. He will endeavor to determine whether your foot has been subjected to abuse, misuse or disuse and will prescribe the best treatment for its present condition.

Abuse of the feet is largely a matter of ill-fitting shoes—too short, too narrow, too pointed, too high-heeled, too thin-soled, or with soles that are not flat but have a rocker-bottom appearance. A too-short stocking may also be responsible for foot trouble.

Misuse commonly means walking, standing or running with the toes pointed out instead of straight ahead. It also means throwing the weight of the body on the inside of the foot.

Disuse is insufficient exercise, causing the feet to grow weak. When the feet are not properly exercised, the muscles supporting the arches often become weakened until the bony framework sags and the feet are nearly flat.

It is almost impossible to maintain good posture if one has deformed or weakened feet. Bad posture usually forces the vital organs of the body out of proper position and may lead to poor general health.

If you are having difficulty with your feet, consult your doctor who will advise about treatment, or may recommend seeing an orthopedic specialist. You may need a different type of shoe, or special foot and leg exercises, or some particular kind of arch support.

The joys of outdoor life, the pleasures of sightseeing, the benefits of walking, and the enjoyment of athletic sports are only for those who have sturdy, dependable feet.

The Metropolitan booklet "Standing Up to Life" presents useful foot exercises and contains valuable information on the care of the feet and on how to select shoes that fit. A postcard will bring you a free copy. Address Booklet Department 12-J-37, Canadian Head Office, Ottawa.

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